

The Iron Age

A CHILTON

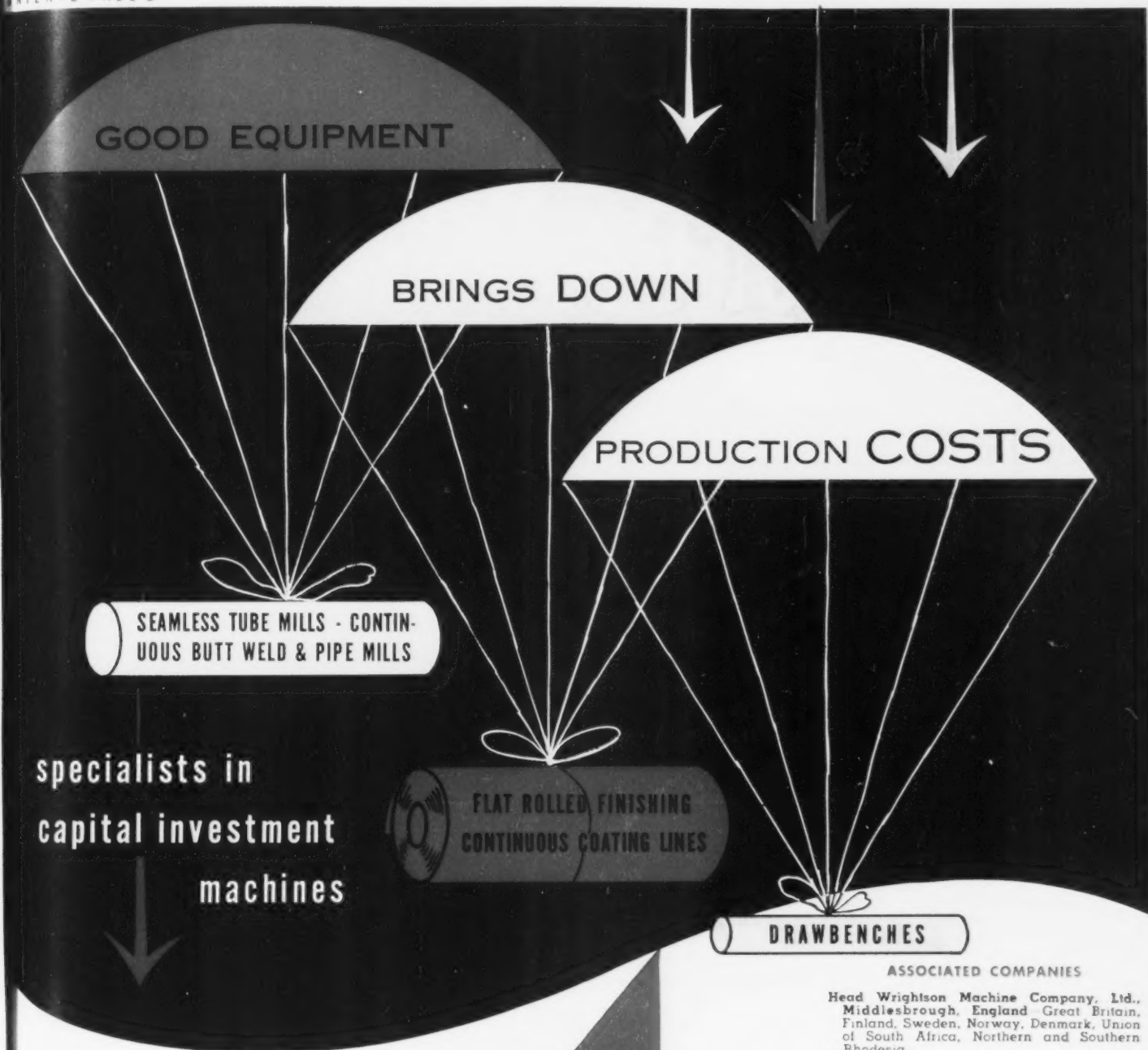
National Bureau of Standards
Library N. W. Bldg.
PUBLICATION

Oct 1

THE NATIONAL METALWORKING WEEKLY

October 9, 1952

CONTENTS PAGE 2



Aetna-Standard

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Plants in Warren, Ohio • Ellwood City, Pennsylvania

ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd.,
Middlesbrough, England Great Britain,
Finland, Sweden, Norway, Denmark, Union
of South Africa, Northern and Southern
Rhodesia.

Aetna-Standard Engineering Company, Ltd.,
Toronto, Ontario, Canada.

M. Castellvi, Inc., New York, N. Y.—Mexico,
Central and South America.

Societe de Constructions de Montbard, Paris,
France—France, Belgium, Holland, Luxem-
bourg, Switzerland.

Demag Aktiengesellschaft, Duisburg, Ger-
many—Germany, Austria, Yugoslavia,
Greece, Turkey, Egypt.

Compagnia Italiana Forme Acciaio, Milano,
Italy—Italy.

Aetna-Japan Company, Ltd., Tokyo, Japan—
Japan.

Hale & Kullgren, Inc., Akron, Ohio—Repre-
sentative for the Rubber Industry.

Designers and Builders to the Ferrous,
Non-Ferrous, Leather and Rubber Industries

How Hot can a Jet Get?

Whooosshh! Jet engines generate a powerful amount of heat . . . heat which, uncontrolled in flight, would cause disastrous metallurgical distortions within the delicately balanced engine. So the problem is . . . or rather was . . . how to provide a dependably accurate means of measuring exhaust temperatures so that the pilot might have control over how hot his jets get.

And the answer? Special wiring harnesses running from engine to instrument panel . . . harnesses now made exclusively with Hoskins Chromel-Alumel thermocouple alloys.

Yes, wherever durability and accuracy are required in a thermocouple . . . whether for jet engines or industrial furnaces . . . you'll

find Chromel-Alumel *right* for the job. Extremely durable . . . highly resistant to heat, corrosion, oxidation . . . guaranteed to register true temperature-E.M.F. values within specified close limits.

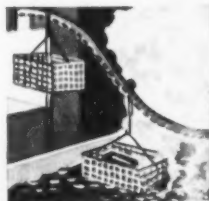
That's only part of Hoskins' product picture, though. Other specialized quality-controlled alloys developed and produced by Hoskins include: Alloy 785 for brazing belts; Alloy 717 for facing engine valves; special alloys for spark plug electrodes; Alloy 502 for heat resistant mechanical applications. And, of course, there's Hoskins CHROMEL . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products.



Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.



Sparks fly better, last longer in today's spark plugs . . . thanks to Hoskins' spark plug electrode alloys.



Hot stuff for hot jobs! Hoskins Alloy 502 is ideally suited to many mechanical-structural applications.



HOSKINS
MANUFACTURING COMPANY

4445 LAWTON AVENUE, DETROIT 2, MICHIGAN



Tool Steel Topics



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

CARBON TOOL STEEL— Toolmakers' First Choice

So many tool steels have been developed for special applications that some people overlook the many uses for carbon tool steels. Actually they're used in larger quantities than any other type of tool steel. An experienced toolmaker usually considers them first, recognizing that they are the logical steels for a starting point.

Here's why carbon tool steels are so popular:

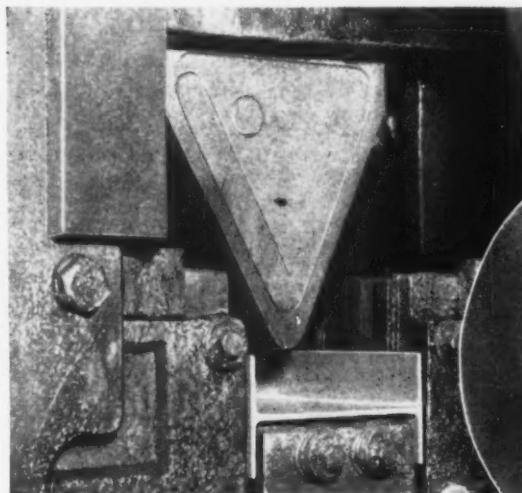
- Easiest to machine of all tool steels
- Easy to heat-treat
- High surface hardness reinforced by a tough core
- They develop keen cutting edges

Hand chisels, center punches, and various shock tools are usually made from carbon tool steel having a carbon content of from 0.75 to 0.85 pct. Other ranges of carbon content: 0.90 to 1.00 for cold-heading dies; 1.00 to 1.10 for general-purpose tools and dies (this is the most frequently used analysis); and 1.15 to 1.25 carbon for stone-dressing tools, drawing dies, etc. Our carbon-vanadium steels, containing an addition of 0.15 to 0.25 pct vanadium, have similar applications in many instances.

The controlled hardenability and spheroidized structure of all Bethlehem carbon and carbon-vanadium grades assure uniform response in heat-treatment. Our extensive metallurgical research has established the ideal degree of hardenability for a wide range of applications. Your nearest Bethlehem distributor and our mill depot are at your service when you need top-quality carbon tool steel.

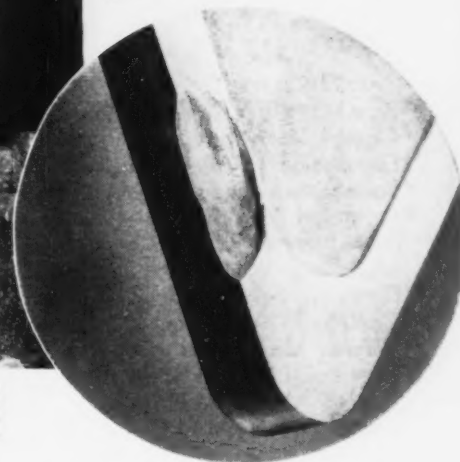


It's easy to machine this chamfering tool holder because all Bethlehem carbon tool steels are carefully spheroidize-annealed to provide a structure that's ideal for easy machining, easy heat-treatment.



After the triangular blade descends and shears a coupon from the web of the steel beam, it moves first to the left and then to the right to shear off the flanges. The lower knife is not visible.

The edge of this shear blade chipped because of misalignment which allowed it to strike the bottom blade. Heat-checking, caused by unexpected high temperatures, is also to blame for such failures.



When cold cuts make hot blades

The shear blades usually lasted about one week in a fabricating shop where steel beams and channels were cut in large quantities. Bad spalls on the cutting edges made it necessary to change blades about once a week, and it was taken for granted that little could be done to make them last longer.

One of our metallurgical men learned of this while in the shop on another job. He began to investigate and soon found that the "cold" cutting was generating about 700 F on the blades. This caused the tool steel to develop heat-checks. In addition, the blade was overloaded due

to poor alignment which allowed it to strike the bottom blade. The combination of heat and overload explained the poor service life.

The solution: Hot-Work 8, one of our hot-work steels, was tried. It's an 8-pct molybdenum analysis that's tops in wear-resistance when operating temperatures are high. Tempered at 750 F, the first blade made a total of 45,000 cuts. The best previous record was 7,700 cuts.

Here's another instance of how the practical experience of our metallurgical contact men helps to put the finger on tool steel troubles.



BETHLEHEM TOOL STEEL ENGINEER SAYS:

Heat-treat the tool, not the thermocouple

Improper temperatures during heat-treating frequently cause tool failures. In many instances the thermocouple chart shows proper heat-treatment temperatures, but the microstructure of the tool proves that the temperatures recorded were not attained by the tool. This is known as "heat-treating the thermocouple instead of the tool."

Most furnaces show some non-uniformity of temperature — locations near the source of heat are hotter than remote locations and the bottom tends to be colder than the top. A survey of each furnace will reveal the temperature differ-

ences which are present. This information makes it possible for the operator to select the location which will indicate most accurately the temperature of tools heated in the furnace; quite often the need for more than one thermocouple is apparent.

A thermocouple indicates the temperature of its tip only, so it's good practice to place the tip of the thermocouple as near to the tools as possible. Locations near the floor, sides, roof, or near the source of heat should be avoided. The thermocouple is an accurate and highly useful device, but it's not foolproof.

The Iron Age-DIGEST

Vol. 170, No. 14
October 9, 1952

CONTENTS

★ Starred Items are digested on opposite page.

EDITORIAL

Gird Yourself 7

NEWS OF INDUSTRY

★Special Report: Steel Plant of Tomorrow	193
Raw Materials: New Coke Ovens Go to Work	195
★Construction: No Easing of Structural	196
★Management: When Industry Goes Rural	197
★Labor: Automakers Stage Man Hunt	199
★Expansion: Round Three—Aluminum Boost	200
Production: Making First A-Gun Carriage	201
Marketing: Warehouse Cupboards Bare	202
★Financial: Industry Asks OPS Price Aid	204
Controls: NPA Gloomy on Steel Outlook	205
Defense Contracts	207
Personnel: Iron Age Salutes	249
Iron Age Introduces	251
Clearing House	434

NEWS ANALYSIS

Newsfront	191
Automotive Assembly Line	210
This Week in Washington	215
West Coast Report	219
Machine Tool High Spots	221
Canadian Comment	223

TECHNICAL ARTICLES

★Record Metal Show Attendance Predicted	257
Technical Program of Metal Congress	258
★Metals for Tomorrow	259
★The Road Ahead	292
Metal Show Exhibitors	328
Steel: Workhorse Today and Tomorrow	382

MARKETS & PRICES

★The Iron Age Summary—Steel Outlook	395
Market Briefs	397
Nonferrous Markets	398
Iron and Steel Scrap Markets	402
Comparison of Prices	406
Steel Prices	408

REGULAR DEPARTMENTS

Dear Editor	9
Fatigue Cracks	11
Conventions and Meetings	13
Free Publications	225
New Equipment	231

INDEX OF ADVERTISERS

455

THE IRON AGE, published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. \$8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, \$15; other Foreign Countries, \$25 per year. Single copies, 35c. Annual Review and Metal Industry Facts Issue, \$2.00. Cable: "Ironage," N. Y.

NEWS AND MARKETS

STRUCTURALS SHORTAGE WILL HOLD INTO '53—P. 196

Generally, steel supply is expected to ease in early 1953. But this may not be true of structurals and heavy plate for construction. Some observers say structurals will stay tight almost all next year. Demand is heavy and strike losses really hurt. Quote 9-month delivery on fabricated steel.

HOW TO PLAN FOR BUILDING RURAL PLANT—P. 197

Management of many companies planning to move to more rural surroundings are asking searching questions and getting encouraging answers. These areas want industry to move in. But the company must weigh advantages against disadvantages. They should take positive steps to hold the area's good will.

DETROIT AUTOMAKERS IN LABOR MAN HUNT—P. 199

Automakers are engaged in an intensely competitive hunt for workers. Many incidents point to a labor tightness—if not a shortage. Manpower in metropolitan Detroit is virtually exhausted. Outlying areas are suffering more severely. Many signs point to a long-term tightness if good business continues.

SET THIRD ROUND ALUMINUM GROWTH GOAL—P. 200

The government is ready to back a third round of aluminum expansion—this time to the tune of 200,000 tons of new capacity. Except as last resort no cash aid is planned but U. S. will show leniency in granting certificates of necessity. As usual new firms will be encouraged to enter the business.

WILL OPS HELP IN BEEFING UP PROFITS?—P. 204

Manufacturers are camped at OPS' doorstep demanding that some means be given them to pass along higher costs in labor, transportation, etc. Higher costs have dealt profits a hard blow. Pass-through of higher costs for a few basic metals is hardly a solution. OPS is stubborn in yielding genuine relief.

STEEL OUTPUT, DEMAND REACHING NEW HIGH—P. 395

Record steel production is being snatched up by strike starved consumers as fast as it can be shipped. Only signs of soft spots found in a very tight market are in specialty items wire, straight chrome stainless, and silicon sheets. Shipping pressure is causing shortage of freight cars in some areas.

of the METAL SHOW ISSUE



METALS FOR TOMORROW

TITANIUM FABRICATING PROBLEMS, PLUS HIGH PRICE HOLD BACK WIDER USE—P. 260

Perplexing engineering and production problems face the budding titanium industry. The glamor is gone; in its place there are tough stark engineering and production problems to be met and solved. Hundreds of test applications are being tried but few parts are in production yet. Titanium is a war baby; government pressure for more capacity will continue though cost is high.

MOLYBDENUM METAL SHOWS PROMISE FOR USE IN JET ENGINE APPLICATIONS—P. 280

Now available in almost any form, it can be coated or clad to protect against oxidation at high temperatures. . . . Alloys are superior to the pure metal.

SILICON COATING ON OTHER METALS IMPROVES THEIR OXIDATION RESISTANCE—P. 282

Siliconized steel could replace high alloy steels and castings for corrosive or high temperature applications where high impact strength is not required.

SELENIUM USE IN ELECTRONICS IS GROWING SO FAST THAT SUPPLY IS SHORT—P. 283

With demand topping supply by 200 pct the emphasis is on new or more efficient recovery methods, including recovery from certain growing plants in the West.

VANADIUM AS A METAL HAS SOME INTERESTING ELECTRICAL CHARACTERISTICS—P. 285

Combines marine corrosion resistance with a high modulus-density ratio though present uses of the pure metal are mainly in the atomic energy field.

ZIRCONIUM, NOW USED LARGELY BY AEC, HAS HIGH CORROSION RESISTANCE—P. 286

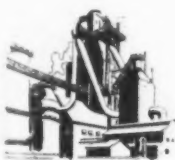
Expanding production with lower price would probably mean considerable use for other than nuclear energy applications . . . corrosion resistance is good.



THE ROAD AHEAD

THE GARGANTUAN U. S. APPETITE DEVOURS METALS AT A FANTASTIC RATE—P. 292

Compared with the turn of the century the U. S. now uses three times more copper, three and a half times more iron ore, four times more zinc and some thirty times more crude oil . . . New materials, methods will ease these problems.



EVOLUTION IN STEEL

GREAT SIZE, WEIGHT AND INVESTMENT DON'T PRECLUDE PROGRESS IN STEELMAKING—P. 193

Steel expansion today requires more careful planning than ever before. No one can afford capacity at \$300 a ton without careful analysis of future possibilities in markets, equipment and process—even in other industries.



METAL SHOW PROGRAM

PHILADELPHIA PREPARES TO WELCOME RECORD ATTENDANCE AT METAL SHOW—P. 257

Over 400 Metal Show exhibitors will occupy Convention Hall . . . Practical demonstrations will be emphasized . . . Technical societies' programs, headquarters, show hours, start on page 258 . . . Exhibitors' booth numbers: Page 328.



Accurate Team Work!

Accurately fitting roof decks are produced at the Fischer Steel Corporation by a Cincinnati Shear and a Cincinnati Press Brake.

The shearing and forming of these long sheets are held to close limits. Production is rapid and smooth—and results in a high quality product.

Write for Cincinnati Shear Catalog S-6 and Cincinnati Press Brake Catalog B-3.

Photos—Courtesy Fischer Steel Corp., Memphis, Tenn.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

OSBORN



Why 400? Deburr 1400 per hour!

Here's how a manufacturer of brass components for ammunition has stepped up production with Osborn Power Brushing:

In the removal of feather burrs from threads and the machined surface of these brass parts, former output was 400 per hour. With the help of the **Osborn Brushing Analyst**, this company designed the brushing machine shown. The parts are placed on spindles of a rotating table. As they pass the Osborn Monitor Brush, they rotate and expose the entire face uniformly to the brush. Parts come clean and smooth . . . at a rate of 1400 per hour! And in another machine, Osborn Brushes deburr the internal threads of this part . . . smooth and fast!

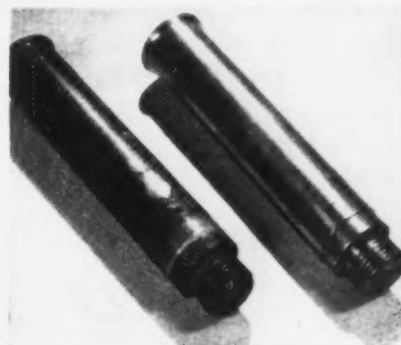
Have the **OBA** show you production-boosting ideas for your shop! Call today or write, *The Osborn Manufacturing Company, Dept. 835, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

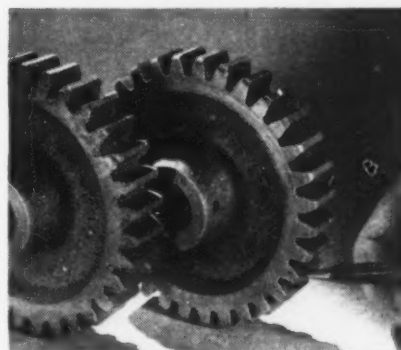
OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES



"CENTERLESS BRUSHING" speeds the production of fine finishes for cylindrical parts such as this compressor piston. One user of this Osborn-developed method gets micro-smooth finishes at outputs as high as 10,000 pistons per 8 hours. Can be applied to many sizes of parts and types of material.



CLEANS SCALE. Heat treat scale on the tube at the left is removed by Osborn power brushing. Result, shown at right, is perfectly clean surface, ready for painting. Have an **OBA** study your product cleaning operations to find ways to cut their cost.



FASTER DEBURRING. Here's another "before and after" example of gear deburring with the Osborn Work Holder Brushing Lathe. Burrs and sharp edges are removed uniformly. Production increases of 20% to 1570% are being reported by users.

SEE YOU AT METAL SHOW

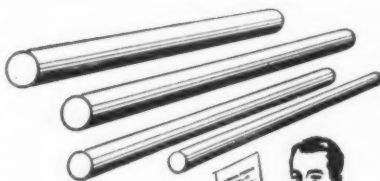
Let us discuss your brushing problem at Osborn Booth 729.



RYERSON

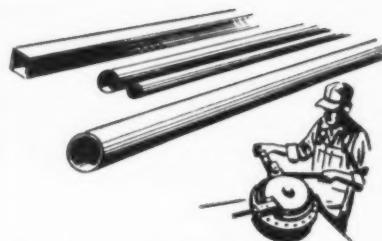
The Industrial P. A.'s Department Store

Here are a few of the many types of steel and related products on hand right now, ready for immediate shipment from your nearby Ryerson plant. Many may be used in place of products that are still hard to get. Check the items you need, and save time by ordering them next time you call Ryerson.



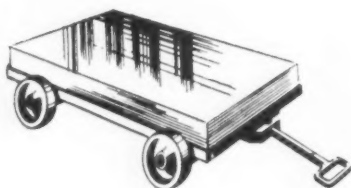
ALLOYS

Tested alloys of known hardenability, both standard and aircraft quality. Complete heat treatment guide with each shipment.



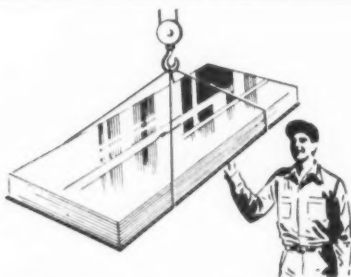
WELDED MECHANICAL TUBING

Hot and cold rolled, rounds and squares in a wide range of sizes. Consider cost. Substitute for seamless tubing.



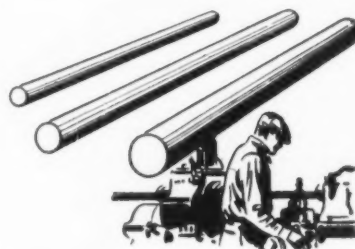
CARBON SHEETS

Both hot and cold rolled coming into better supply, especially cold rolled in the heavier gauges.



STRAIGHT CHROME STAINLESS

No allotment required for these stainless bars, plates and sheets—and they can often replace restricted nickel-bearing types.



TOOL STEEL

Water, oil or air hardening steel. High in quality; economical in price. Hardening data with every shipment.



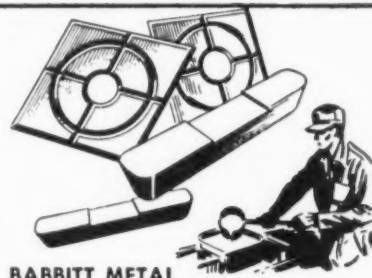
SAFETY PLATE

Strong, non-skid Inland 4-Way Safety Plate protects feet against slipping, floors against wear. Easily fabricated.



CHAIN & WIRE ROPE

Rugged, dependable TM chain, iron, steel and alloy qualities, furnished to order. High quality wire rope shipped from large stocks.



BABBITT METAL

Glyco Babbitt, an exclusive Ryerson product, has physicals equal to high tin Babbitts; costs substantially less and is unrestricted.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

THE IRON AGE

Editorial, Advertising and Circulation
Offices, 100 E. 42nd St., N. Y. 17, N. Y.

GEORGE T. HOOK, Publisher
TOM C. CAMPBELL, Editor

EDITORIAL STAFF

Managing Editor: George F. Sullivan
Technical Editor: Darwyn I. Brown
News-Markets Editor: Wm. V. Packard
Asst. Technical Editor: W. G. Patton
Machinery Editor: E. C. Beaudet
Asst. News Editor: Theodore Metaxas
Associate Editors: H. W. Van Camo,
F. J. Winters, R. L. Hatschek, W. B.
Olson, G. G. Carr; Assistant Editors:
E. C. Kellogg, J. J. Obrzut; Art Direc-
tor: Carl Cerminaro; Regional Editors:
R. W. Bennett, Chicago; R. D. Raddant,
Detroit; J. B. Delaney, Pittsburgh; T. M.
Rohan, San Francisco; G. H. Baker, A.
K. Rannels, R. M. Stroupe, Washington;
Editorial Assistants: L. Brass, M. Per-
rone, C. M. Walker; Correspondents:
F. L. Allen, Birmingham; N. Levenson,
Boston; R. M. Edmonds, St. Louis;
James Douglas, Seattle; Jack Adams,
Los Angeles; F. Sanderson, Toronto; F.
H. Harley, London, England; Chilton
Editorial Board: Paul Wooton, Wash-
ington.

BUSINESS STAFF

Production Manager: B. H. Hayes
Director of Research: Oliver Johnson
Mgr. Circulation & Promotion: C. T. Post
Asst. Promotion Mgr.: James A. Criles
Asst. Dir. of Research: Wm. Lalmbier

REGIONAL BUSINESS MANAGERS

B. L. Herman, Philadelphia; Stanley J.
Smith, Chicago; Harry G. Mumm, Co-
lumbus; Peirce Lewis, Detroit; Paul
Bachman, New England; Charles R.
Lippold, Cleveland; R. Raymond Kay,
Los Angeles; C. H. Oher, New York;
J. M. Saackman, Pittsburgh; Harry
Becker, European Representative.

REGIONAL OFFICES

Chicago 3, 10 S. LaSalle St.; Cleveland
14, 1016 National City Bank Bldg.; Co-
lumbus 9, 1849 Franklin Park South; De-
troit 2, 103 Pallister Ave.; Los Angeles
28, 2420 Chermoya Ave.; New England,
62 LaSalle Rd., W. Hartford 7; New
York 17, 100 E. 42nd St.; Philadelphia
19, 56th & Chestnut Sts.; Pittsburgh 22,
814 Park Bldg.; San Francisco 3, 1355
Market St.; Washington 4, National
Press Bldg.; European, 111 Thorley
Lane, Timperley, Cheshire, England.

Circulation Representatives: Thomas
Scott, James Richardson.

One of the Publications Owned and
Published by Chilton Co., Inc., Ches-
nut & 56th Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

Vice-Presidents: Everitt B. Terhune, G.
C. Buzby, P. M. Fehrendorf, Harry V.
Duffy; William H. Vallar, Treasurer;
John Blair Moffett, Secretary; Maurice
E. Cox, George T. Hook, Tom C.
Campbell, Frank P. Tighe, L. V. Row-
lands, Directors; George Maiswinkle,
Asst. Treasurer.

Indexed in the Industrial Arts Index
and the Engineering Index.



Controlled
Circulation
Audit



National
Business
Publications

Copyright, 1952, by Chilton Co. (Inc.)

October 9, 1952

Editorial

The Iron Age

FOUNDED 1855

Gird Yourself

IT won't be long until the defense program will have reached its peak. Then there may be a plateau. We will have defense problems for a long time. But as we already know, American productive practices and potential can fit them into our everyday work.

This country has potential and capacity undreamed of just 10 years ago. Technical progress and productive efficiency have advanced to the point where they alone have held back inflation.

For 12 years the production of goods and services has responded to a demand that seemed to be insatiable. During that period there was enough business for anyone who wanted to take orders or show a minimum of sales effort.

The increase in the population, the satisfaction of deferred demand, and the defense program have all contributed to full employment and top level output.

The party is coming to a close. Next year or at least by 1954 industry in America will face one of the most competitive periods in its history. The capacity is there, the workers are there, the technique is there. Just how each of these will be used will determine the business mortality rate in the years to come.

Cost-cutting, or at least cost-saving to offset unprecedented wage payments with their increasing amount of fringe benefits, must be met if our industrial world is to survive. There are practical ways of getting in on the ground floor of this necessary movement.

In this special Metal Show issue the editors of THE IRON AGE have prepared a complete report on some relatively new and little known metals. Their sources, their fabrication and their present and potential uses are realistically reported and interpreted.

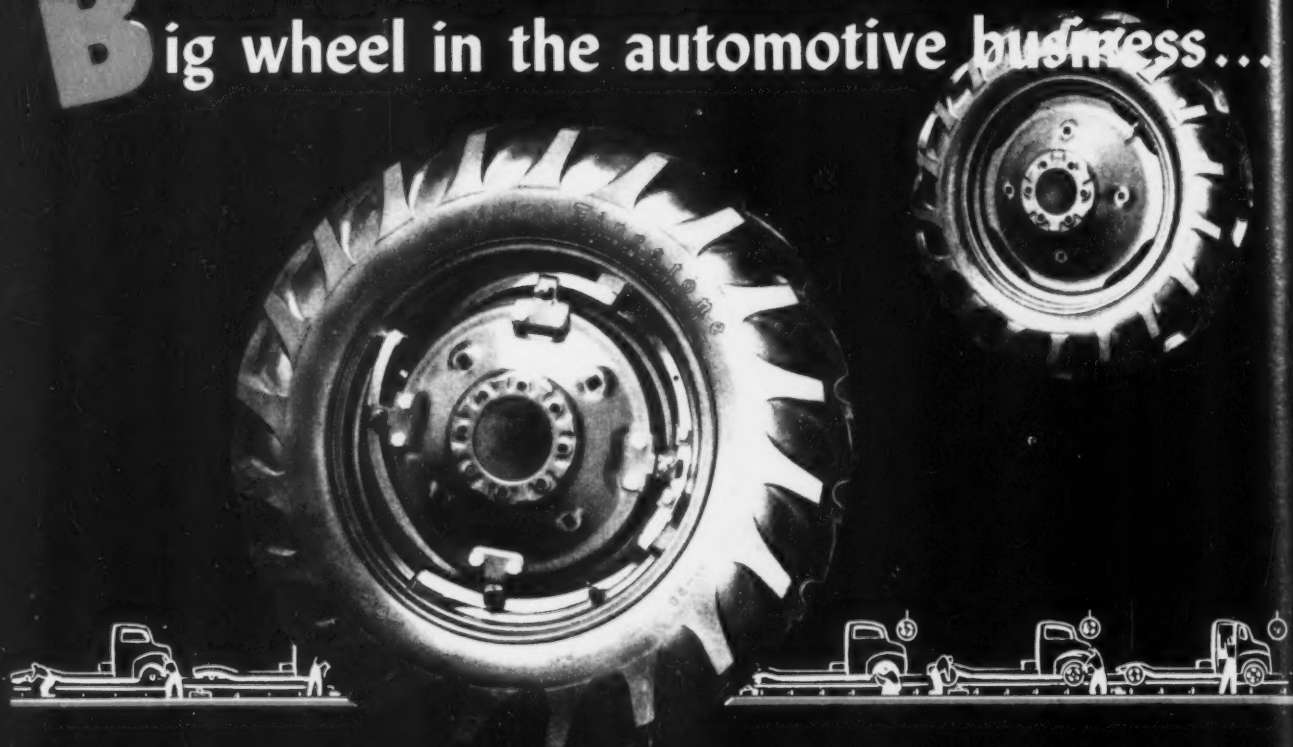
In this issue the advertisers in the metalworking industry are displaying for you their answers for less cost, better quality, new products and proven methods. They are aware of what problems you face next year and the years after.

At the National Metal Exposition in Philadelphia, Oct. 20-24, metalworking and metal producing firms will show you on the spot what their products will do for you; at the Metal Congress the brains of the metalworking industry will hold meetings and discussions on your problems of the future based on the present.

Tom Campbell

Editor

Big wheel in the automotive business...



SHARON* RIM STEEL DECLARED BEST BY LEADING BUILDER OF AUTOMOTIVE WHEELS

We use a lot of wheels here in America. Our cars, trucks, busses, aircraft, farm and construction machinery require hundreds of thousands of wheels annually. Wheels that must be a match for our constantly increasing speeds and weights — wheels that must be tough and durable, exactly round and perfectly balanced.

Mass production is essential to keep the cost of wheel production at a minimum. Today massive wheels are practically squeezed into shape on giant presses at

amazing speeds — each one a perfect circle of weight and balance.

To enable wheel builders to produce at high speeds requires the finest rim and wheel steels. Each coil must be of exactly the right analysis, free of blemishes with consistent gauge uniformity.

Leading wheel makers have learned they can trust Sharon to deliver this kind of steel day in and day out — that's why today Sharon is one of the leading producers of strip steel for the continuous production of rims and wheels.

*Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

For information on Titanium contact Mallory-Sharon Titanium Corp., Niles, Ohio



Yo
Sin
Y
era
cou
poi
bro
wh
wh
pos
I d
ow
see
ma
tio

Co
Ne

Si
is
ex
"T
in
in
de

To
Ro

PI
Si

m
of
m
to
an

pi
or

Il
Fr

ti
or

C
S

sp
a
a
fe
to

n
w
T
a
q
t

(

Dear Editor:

Letters from readers

Younger Generation

Sir:

Your editorial "The Younger Generation" of Sept. 18 was most encouraging. Too often the many pointed facts which you so aptly brought out are soft-peddled everywhere. The great majority of men who read your editorials are in a position to do something about it and I do pray that after analyzing their own lives they will, by God's strength, seek to serve Him and their fellow man and lead "the younger generation" in the right way.

T. R. ALLEN, JR.
Treasurer

Continental Iron & Steel Co.
New York

Sir:

The editorial feature of IRON AGE is always found enjoyable. May I extend my compliments especially on "The Younger Generation" appearing in the Sept. 18 issue. This brings into clear focus the basic causes of degeneracy in youth.

N. J. FINSTERWALDER
Chief Metallurgist

Taylor Instrument Companies
Rochester, N. Y.

Plastic Dies

Sir:

On p. 83 of your Sept. 11 issue you make a statement regarding the use of plastic dies. You indicate that a major producer may be about ready to take them off the experimental list and use them in production.

Can you advise us the name of this producer or give us more information on the use of plastic dies.

K. F. BURGESS, JR.

Illium Corp.
Freeport, Ill.

The company using plastic dies in production is Chrysler Corp. For more details see our story on p. 119 of the Sept. 18 issue.—Ed.

Costs

Sir:

On p. 59 of your Sept. 25 issue, in spelling out the difference in costs to a purchasing agent for a 7 in. standard I beam, you mention a price range for imported steel of \$165 to \$185 per ton delivered Chicago.

This institute includes most foreign mill agents and a good number of the well established importers of steel. The price range mentioned in your article is not indicative of the prices quoted for imported steel by the established firms. A figure of \$132 to

\$140 per ton delivered in Chicago depending upon quantity and transportation is very much closer to the actual cost and compares with a mill price of \$86, a warehouse price of \$146, and a conversion price of \$166.

Thus, even in the Chicago area, which from an importer's point of view is in an unfavorable freight location, the present prices of the imported product compare favorably with the cost for warehouse and conversion steel. In other areas closer to the seaboard the price comparison for imported steel is considerably more favorable.

N. SCHILLING
President

American Institute for Imported
Steel, Inc.
New York

Higher prices in The Iron Age article were obtained by contacting three import houses with offices in Chicago.—Ed.

Unloader

Sir:

Please send us the name of the manufacturer of the Rajon car unloader reported on p. 63 of your July 24 issue.

H. V. GULICK
Chief Engineer-Manufacturing
American Locomotive Co.
Schenectady

The manufacturer is MFI, Inc., 1357 N. Sedgwick, Chicago 10, Ill.—Ed.

Radioactive Tools

Sir:

Our foundry section is interested in the article "Radioactive Tools Permit Fast Tool Wear Studies" which appeared on p. 154 of your Sept. 4 issue. We would appreciate 3 copies.

L. C. STRONG
Manufacturing Research Dept.
International Harvester Co.
Chicago

Liquid Coolant

Sir:

May we have permission to reprint two 4-page articles that appeared in your Apr. 17 and Aug. 14 issues on the subject of CO₂ as a liquid coolant?

W. C. BETTES
Pure Carbonic Co.
New York

Transfer Equipment

Sir:

Will you please send us a few tear sheets of the article "Transfer Equipment Stresses Flexibility, Cuts Cost" which appeared in Sept. 11 issue.

M. R. BISHOP
Director of Public Relations
Willys-Overland Motors, Inc.
Toledo

which
cold-rolled
strip steel
costs less
"in the end"



- if variations in physical characteristics are permissible
- if fairly heavy oversize gauge variations are not objectionable
- if the fabricating operations are not too complicated and do not require intricate, expensive dies
- if a fine surface finish is not essential
- if a good base for paint or enamel is desired
- if you do not object to some "square footage" loss due to oversize variation
- then Sheet Coil will probably be the most economical material for the job . . .

. . . on the other hand—

- if you must have a high degree of uniformity of chemistry and physical properties—and precision gauge tolerances
- if you wish to avoid rapid die wear due to heavy oversize gauge variations
- if you require a fine finish or a better base for plating
- if you want maximum "square footage" for greatest parts yield per ton
- if you want selected tempers for maximum strength and lightest weight
- then you'll find C. M. P. THINSTEEL far and away the most economical material

To be sure of getting the right steel, order "sheet coil" or "THINSTEEL" and be sure each coil carries an identifying tag. If we can help you select the right grade, just call on us.



750, BOULEVARD
KENILWORTH, N. J.

SPECIALISTS IN FLAT ROLLED
METAL PRODUCTS

Telephones: N Y COrtlandt 7-2427
N J UNionville 2-6900
Teletype: Roselle, N J 387

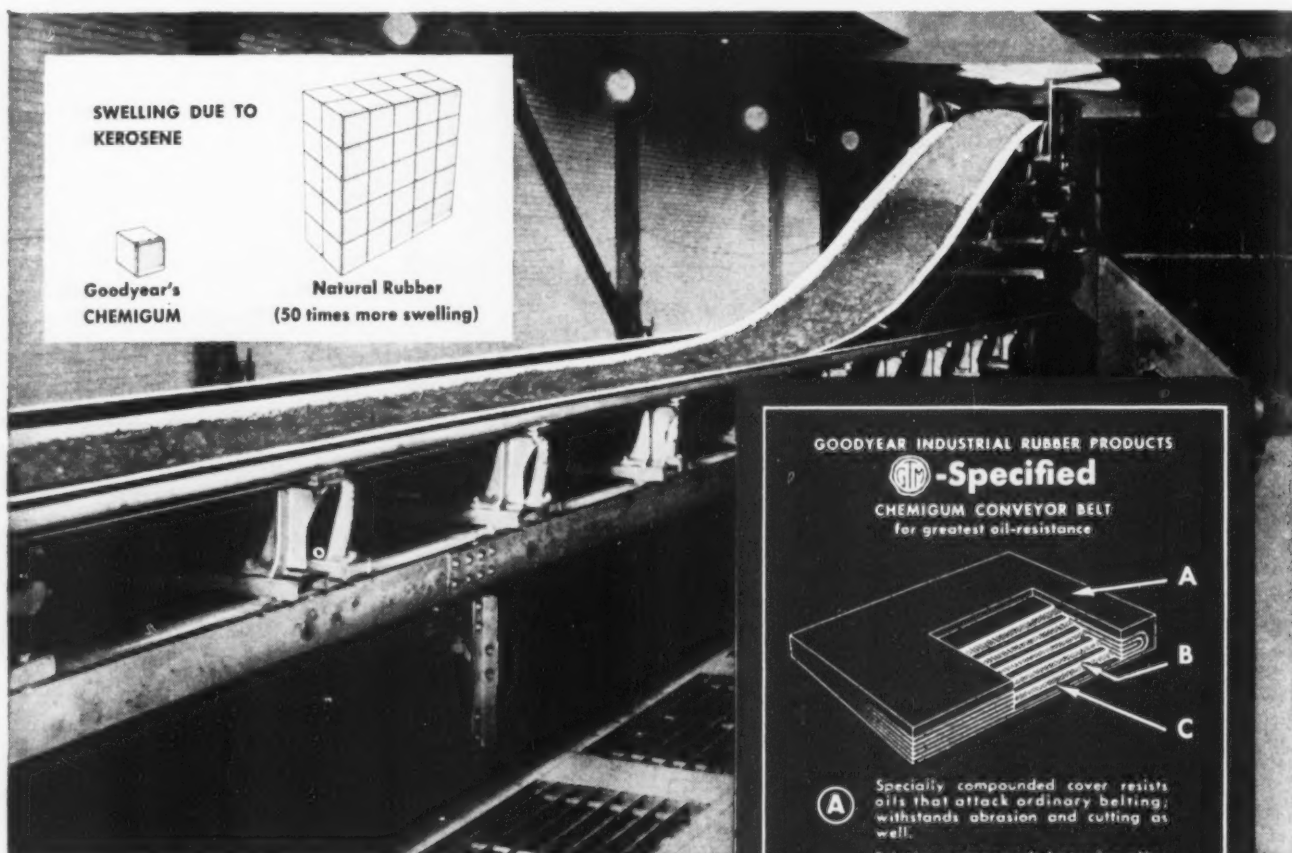
Here's the LONGEST-LASTING BELT

for handling Oil-Treated Fuel

HERE's graphic evidence of the oil-resistance built into the covers and carcass of CHEMIGUM conveyor belts—designed by the G.T.M.—Goodyear Technical Man—for use in service where severe oil and grease conditions cause premature failure of conventional belts.

Tests with kerosene show that Goodyear

CHEMIGUM covers swell only 2% as much as high-grade conveyor covers made from natural rubber. (See Chart.) CHEMIGUM will also resist oil far better than many other oil-resisting synthetics used in belts. When destructive effects of such solvents are present, consult the G.T.M. for full details, or write Goodyear, Akron 16, Ohio.



LOOK FOR YOUR GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.

GOODYEAR

THE GREATEST NAME IN RUBBER

Chemigum—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

Fatigue Cracks

by Charles T. Post

Metals for Tomorrow

Your favorite family journal is bursting its seams this week, just as it does every year at this time in anticipation of the National Metal Show.

Don't get the idea that the special 24-page section on "Metals for Tomorrow" was easy to get together, even for your f.f.j.'s brains department. The editors first got the idea last Spring and it was gestating right up until press time on Tuesday. The title, "Metals for Tomorrow," is full of portent, but it makes us feel very old. We can remember very well sitting in Chem class in high school and studying the periodic chart. Most of the metals now coming into common use were no more than symbols on it.

Incidentally, if you would like to have a copy of the "Metals for Tomorrow" section for your file, just let us know. A few reprints are being made, and we are pretty sure we can snitch up to half-a-dozen per customer, on the house.

Titanium

Our Harlem reporter swears that Titanium is coming into high favor as a name for baby girls born in the neighborhood.

At first glance, it sounds sort of attractive, what with all the talk about the "Cinderella metal" and so on. But when the babies grow up, we hate to think that they will take on the attributes of the metal—cold in appearance, expensive.

Chew

Once in a while we pick up one of the trade papers that circulate among advertising men, and almost invariably we get the willies at some of the weapons the boys use to sneak up on us.

For instance, *Advertising Age* a couple of weeks ago had a long piece on how Wrigley gums advertising agency worked with social and psychiatric scientists "to uncover and analyze the emotional factors concerned with chewing, with particular application on why people chew gum." The study was made at the Institute of Psychoanalysis in Chicago.

So far as our friends are concerned—they as chews—we'd always supposed that they liked the flavor of Tutti-Frutti, were trying to give up smoking with Doublemint, or chose Spearmint after

they had gulped three Martinis at lunch and had to face the boss or a customer.

We were all wrong. One of the three basic reasons people chew gum, *Advertising Age* tells us, is "symbolic hostility or aggression." Maybe our gum chewing friends aren't our friends at all, and we had better watch out for a stiletto in the back. Other reasons: (1) Oral comfort; (2) release of tension, or relaxation. Even if they aren't sore at us, then, they are comfort-seeking bums about to lie down on the job. Those are no kind of people to be associated with.

Anyhow, this advertising agency really took a deep plunge after finding those things out. It started building some advertising around a frustrated child, going from there to a similar adult situation. The ads sold lots of gum in eastern Pennsylvania, and it looks as though they may close in on the rest of the country.

If this sort of thing keeps up, we are going to be darn careful before we read the ads—except in your f.f.j., of course—or conflicting approaches to our subconscious will land us on the psychiatrist's couch for sure and we'll have to park our gum surreptitiously below the upholstery.

Puzzler

The deeper we get into this puzzle business, the more convinced we are that some puzzles are classics that were probably pondered by the Greek philosophers for relaxation. We knew that the problem of the 12 counterfeit dollars had driven *Fatigue Cracks* readers nutty a few months ago, only we called them golf balls then. But now Noel F. Jannotta of the Philadelphia Toboggan Co. writes that "Don Rose, a columnist for the *Evening Bulletin*, picked it up from his nephew two years ago and after some controversy as to whether it was possible to solve or not, he finally put it in his column for readers to take a crack at. That really started something around Philadelphia in various engineering rooms, but I finally solved it after too long a time (believe me, that was a stinker) and sent it in . . . for which he gave me honorable mention in his column."

Oh, yes. Mr. Heilman had 24 chickens in his flock. No puzzle this week, children. You'll want to spend your time reading about "Metals for Tomorrow."

SEND FOR
THIS FREE
BOOKLET
TODAY!



Here's a way to save time
and improve finish quality

See why diamond is the fastest cutting of all abrasives . . . and why Elgin Diamond is the fastest cutting of all diamond abrasives. Illustrations and specific data on plastic mold polishing, drawing die finishing, tool and gage lapping and mass production polishing of component parts will help you solve your own finishing problems. Write for your copy now . . . ask for a free demonstration in your own shop to prove how you will save when you . . .

Finish with Diamond...
ELGIN Diamond!

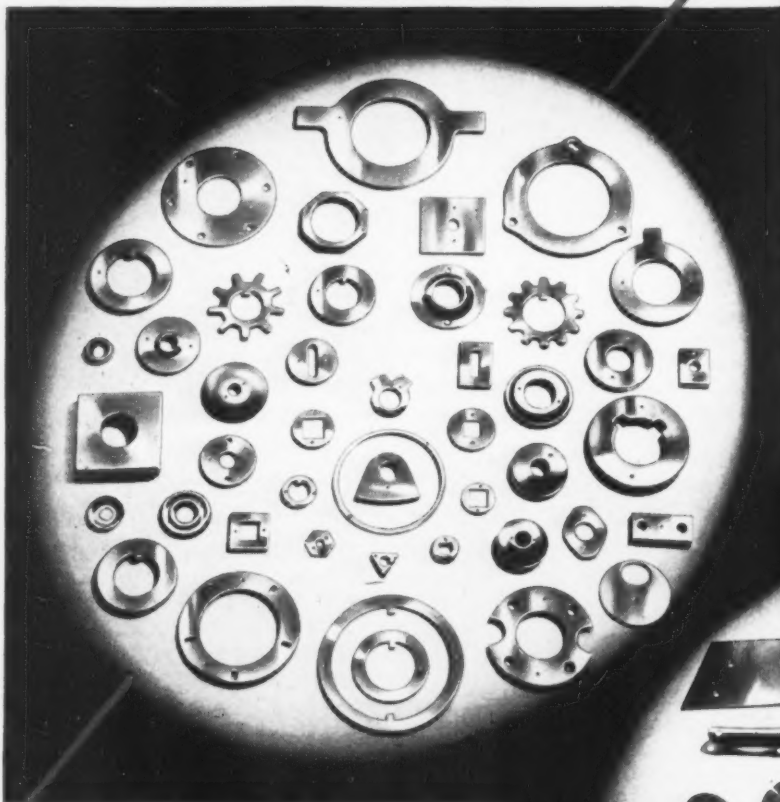
ABRASIVES DIVISION, DEPT. C
ELGIN NATIONAL WATCH CO.
ELGIN, ILLINOIS

Your Most **DEPENDABLE** and **EXTENSIVE** Source of Supply for ALL Types of Standard and Special **WASHERS**

**MILWAUKEE
WROT WASHERS**

**SINCE
1887**

Washers are stocked in thousands of different sizes, including all standard and semi-standard sizes. If your requirements cannot be met from this extensive inventory, more than 22,000 sets of dies are available to take care of special orders, or we will make up dies to meet your individual needs. Write for Catalog "30" — 76 pages covering full line of washers, tool list for producing washers, helpful reference tables and other data.



STAMPINGS

Large scale production facilities enable us to effect worthwhile savings, in many instances producing stampings more economically than possible in our customers' own plants. Our own tool and die-making shop enables us to make up dies necessary for producing new stampings, working directly from your blueprints.

Let us quote on your requirements . . . covering fabrication in any material and in any finish. Furnished machined, heat-treated or surface ground, as may be specified.

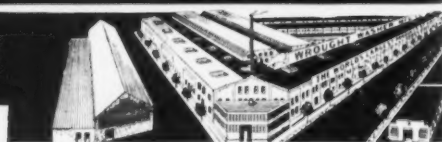


WROUGHT WASHER MFG. CO.

THE WORLD'S LARGEST PRODUCER OF WASHERS

2202 SOUTH BAY STREET

MILWAUKEE 7, WISCONSIN



A 7166-1PC

Conventions & Meetings

Oct. 8-10—Compressed Air & Gas Institute, semi-annual meeting, Shawnee Inn & Country Club, Shawnee-on-Delaware, Pa. Institute headquarters are at 90 West St., New York.

Oct. 10-11—American Society of Tool Engineers, International Area Meeting, Statler Hotel, Buffalo, Society headquarters are at 10700 Puritan, Detroit.

Oct. 11-14—National Assn. of Waste Material Dealers, National fall meeting, Hotel Ambassador, Los Angeles, Association headquarters are at 271 Madison Ave., New York.

Oct. 13-17—American Institute of Electrical Engineers, Fall General Meeting, Jung Hotel, New Orleans, Institute headquarters are at 33 W. 39th St., New York.

Oct. 14-16—Seventh Annual Industrial Packaging & Materials Handling Exposition, Chicago Coliseum, headquarters are at 20 W. Jackson Blvd., Chicago.

Oct. 16-17—Gray Iron Founders' Society, Inc., 24th annual meeting and convention, Hotel Cleveland, Cleveland.

Oct. 17-19—Metal Treating Institute, annual meeting, Hotel Warwick, Philadelphia. Institute headquarters are at 271 North Ave., New Rochelle, New York.

Oct. 19-21—Conveyor Equipment Manufacturers Assn., Annual Meeting, The Greenbrier, White Sulphur Springs, West Virginia. Association headquarters, 1129 Vermont Ave., N. W., Wash., D. C.

Oct. 19-24—American Welding Society, 33rd National Fall Meeting, The Bellevue-Stratford Hotel, Philadelphia, Pa.

Oct. 20-22—American Institute of Mining and Metallurgical Engineers, Institute of Metals Div., fall meeting, Hotel Adelphi, Philadelphia. Institute headquarters are at 29 W. 39th St., New York.

Oct. 20-24—National Metal Congress & Exposition, Convention Hall, Philadelphia.

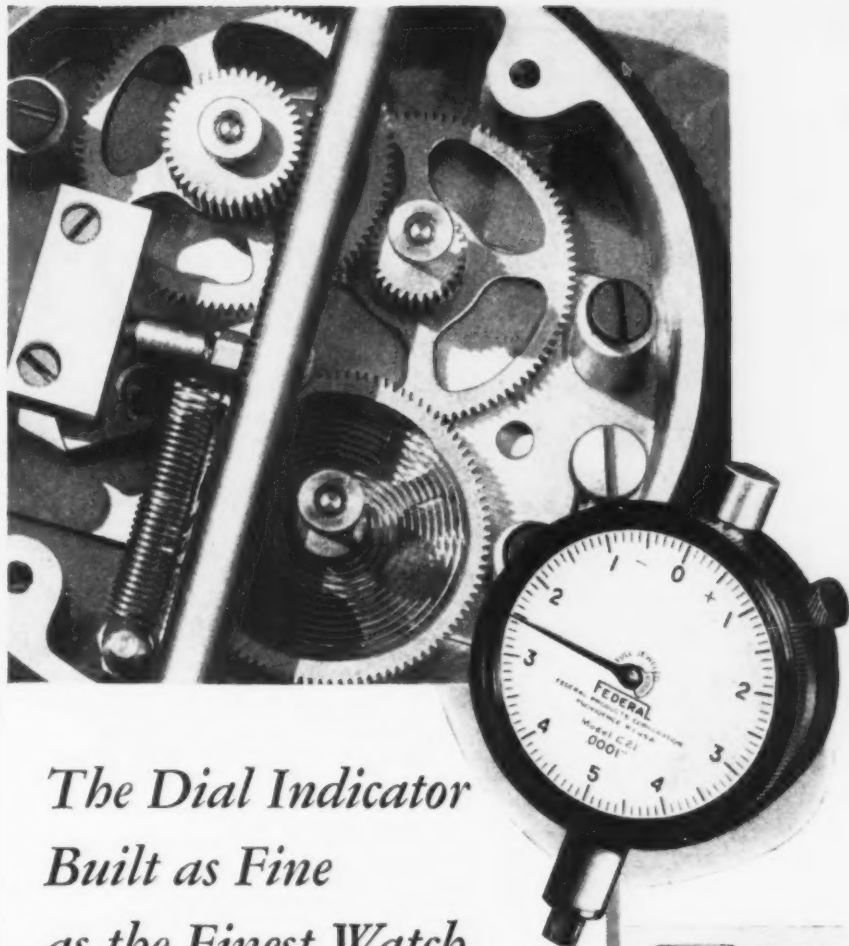
Oct. 20-24—National Safety Council, national safety congress and exposition, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 21—Gas Appliance Manufacturers Assn., Industrial Gas Equip. Div., Hotel Warwick, Philadelphia.

Oct. 22-24—Society of Automotive Engineers, Inc., National Transportation Meeting, Hotel William Penn, Pittsburgh. Society headquarters are at 29 W. 39th St., New York.

Oct. 23-24—Steel Products Warehouse Assn., annual meeting, Waldorf-Astoria Hotel, New York.

Oct. 24—Malleable Founders' Society, Western Section Meeting, The Drake, Chicago. Society headquarters are at Union Commerce Bldg., Cleveland.

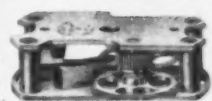


The Dial Indicator Built as Fine as the Finest Watch

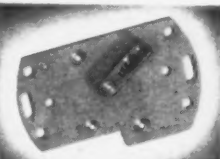
Today the Dial Indicator is built mechanically as fine as the finest watch, for years the standard of comparison for fine manufactured articles.

Gear teeth must be carefully designed and precisely cut. All bearings and bushings are fitted precisely to eliminate lost motion and excessive friction. Inertia is held to a minimum. Exceptional fidelity is required so Dial Indicator "repeats" the same reading for the same amount of variation. Stamina and durability are essential to withstand sudden shock and rough abuse.

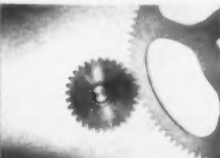
At Federal Products Corporation we are constantly aware of the importance of these requirements. Federal leads in the development of Low-Friction, Low-Inertia, Full-Jeweled Indicators. Federal's top and bottom movement plate construction has long defied improvement and Indicator maintenance men prefer it to all others. Send for Federal's latest catalog showing the most complete line of Dial Indicators and Indicating Gages. Federal Products Corporation, 1310 Eddy Street, Providence 1, R. I.



Note rigid assembly of top and bottom plates and massive support for pinion bearing — features which mean long lived accuracy.



Bottom plate of heavy gage brass showing jeweled bearings and precision workmanship.



Teeth of gears and pinions are cleanly cut — not stamped — and they mesh accurately.

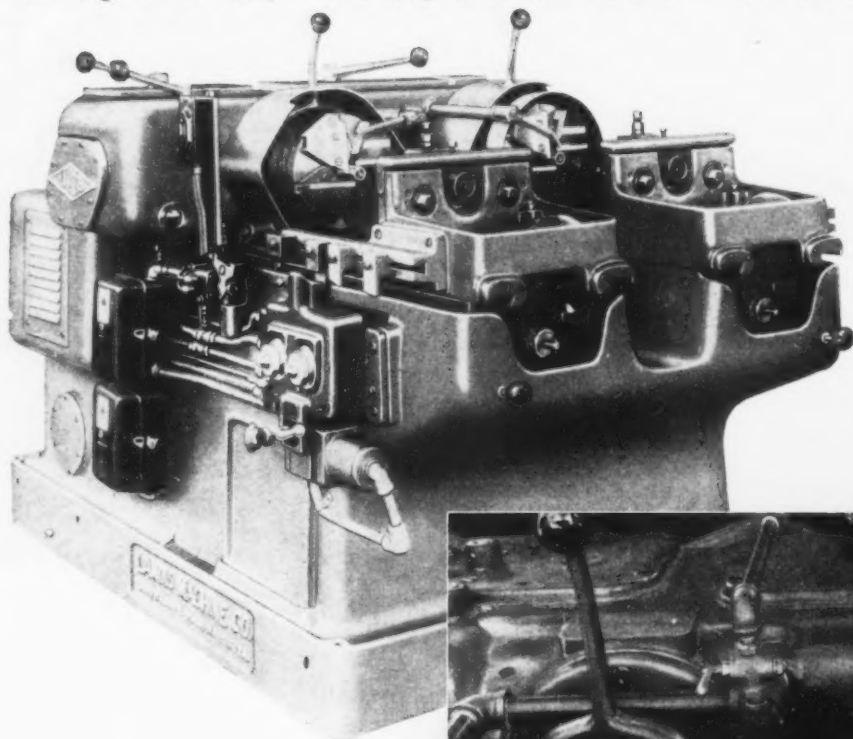
FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES



HOLLOW MILLING

Extra LANDIS Feature...



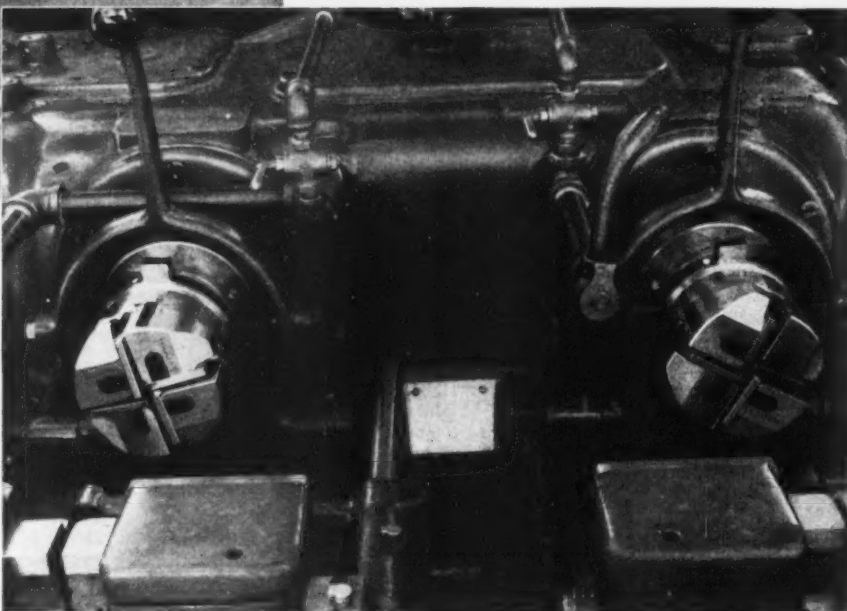
Many Production Advantages

Hollow milling by this method offers an increased efficiency occasioned by the application of a multiple number of cutting tools. The feed rate is thus approximately equal to that of a single tool, multiplied by the number of simultaneously-functioning cutters in the unit—four or six for LANDIS Heads.

The LANDMACO Double Head Lead-screw Threading Machine affords a particularly efficient hollow milling method. One carriage will perform the milling operation while the other carriage is being loaded by the operator, thus allowing consistent continuous production. In addition it is entirely practical to perform milling operations on one spindle and conventional threading operations on the other.

LANDIS Turning Cutters

LANDIS Cutters are economical tools for they are usable for most of their



original length. Only the rake angle needs regrinding—a quick and simple procedure. One set of cutters will machine a wide diametrical range of work, and cutting speeds will range from 30 to 70 linear feet per minute.

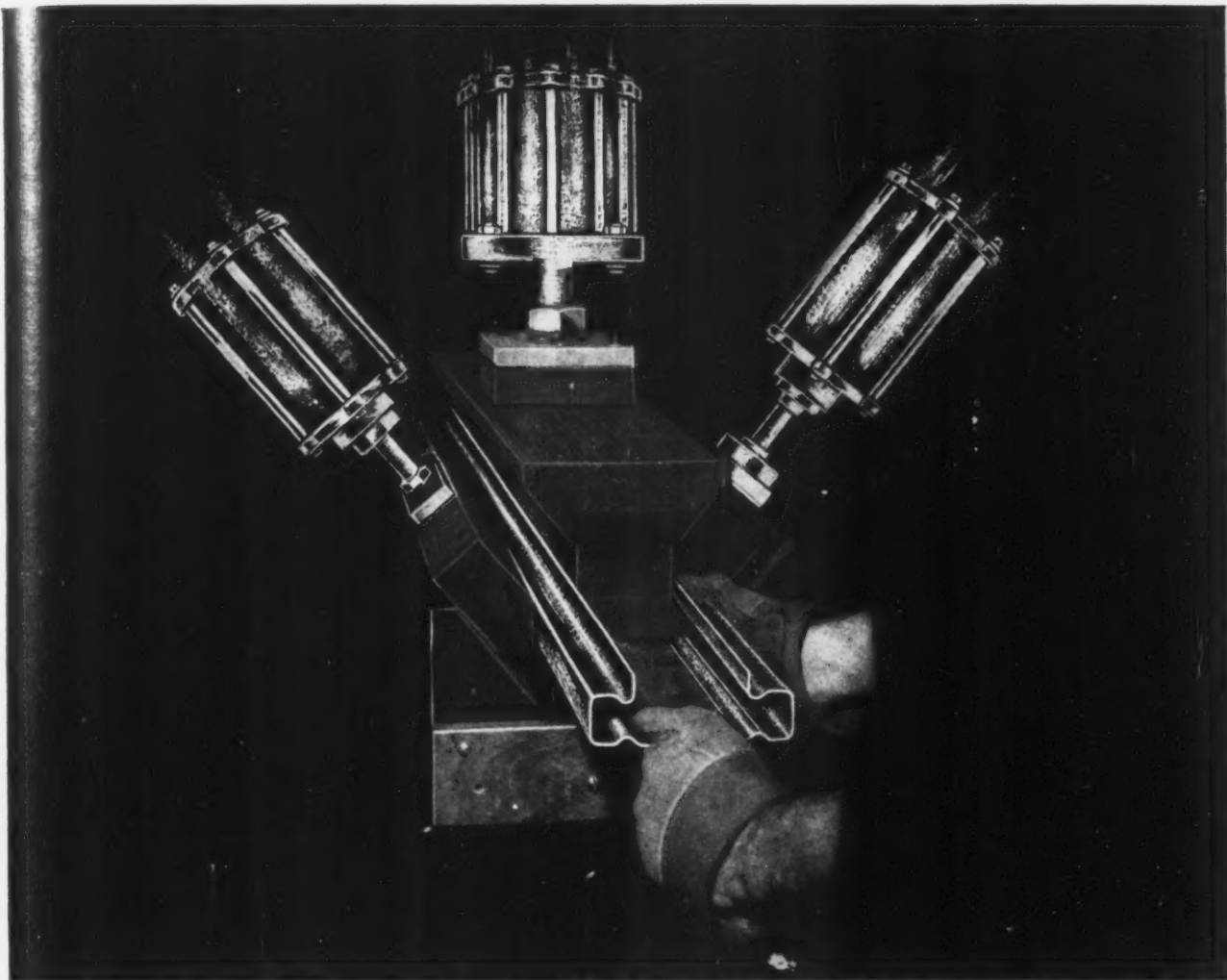
Wear and breakage of tools and spoiled work is held to a minimum. The cutting edges of the cutters can be pre-

LANDIS Die Heads, in addition to conventional threading operations, can be equipped with LANDIS Turning Cutters which will perform turning, grooving, forming, and facing by the hollow milling method. Milling operations may be performed by LANDIS Heads applied to automatic screw machines, turret lathes, or LANDIS leadscrew-type or hydraulic-feed threading machines, and other positive-feed-type machines.

cisely and uniformly located with relation to the center line of the work since they are diametrically-opposed in the cutting position. Thus with cutting strains evenly distributed, the work-piece is never forced out of alignment.

Additional information will be supplied on request—please include specifications.

LANDIS Machine COMPANY · WAYNESBORO
PENNSYLVANIA



Forming metals in press equipped with draw dies fabricated from Formica "Gauge-wood"

NEW TOOLS FOR METAL FORMING

There's a new source of tools for the metalworking industries—*densified wood*, product of the union of wood and **BAKELITE** Phenolic Resins. Aircraft part templates, bearings, automotive part dimension gauges, drill jigs, and foundry patterns are already being made from this unusual material. Its advantages—high impact strength, comparatively light

weight, ease of repair, and economy.

Densified wood, in the form known as Formica "Gauge-wood," is made into tools that maintain their exact size and shape under variable conditions of heat and moisture. It is dimensionally stable, resistant to water, chemical attack, abrasion, and warping. It can be bored, threaded, tapered, grooved or machined to close tolerances, then buffed to a high surface luster. It may be altered or repaired quickly and economically by patching.

Cross-laminated veneers are impregnated with **BAKELITE** Phenolic Resins and pressed to 50% of the original thickness to form densified wood, making it a hard, compact, wood-resin structure. Harder than any solid wood, lighter than any

solid metal, it is well suited to jobs requiring strength, stability, and accuracy. It may be useful in your operations. For information, write Dept. DZ-44, requesting a copy of booklet H-12, "Densified Wood Made with **BAKELITE** Phenolic Resins."

BAKELITE
TRADE-MARK
PHENOLIC RESINS



BAKELITE COMPANY

A Division of
Union Carbide and Carbon Corporation

30 East 42nd Street, New York 17, N. Y.

In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.



New- FLEX-TESTER

Developed by Jones and Laughlin Steel Corporation and manufactured and sold exclusively by Steel City Testing Machines, Inc.

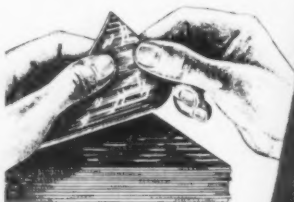
For non-destructive testing of sheet metal for drawing qualities and stretcher strain

This important contribution to sheet metal testing is simple, compact and does its job quickly. The **Flex-Tester** bends a corner of a sheet through a standard arc measuring on a dial indicator the resistance of the metal to the bending operation. A "**Dial Converter**" furnished with the tester enables the operator to convert readings obtained on various thicknesses of material to a standard for the purposes of comparison. The lower the corrected reading, the better the drawing quality of the material.

A **spherometer** is also supplied. It measures the curvature of the permanent set of the metal and thereby gives an indication of the stretcher strain characteristics. The **Flex-Tester** is a must for steel mills, stamping plants, warehouses. Write us if you wish detailed information on the **Flex-Tester** or if you wish us to have a representative call and demonstrate this testing machine to you. It is light-weight (only 6 lbs.) and easily carried.

On Display
Metal Show
Booth No. 1416

THE OLD WAY



NOW



FLEX-TESTER TESTS FOR DRAWING QUALITY



SPHEROMETER MEASURES
STRETCHER STRAIN CAPACITY

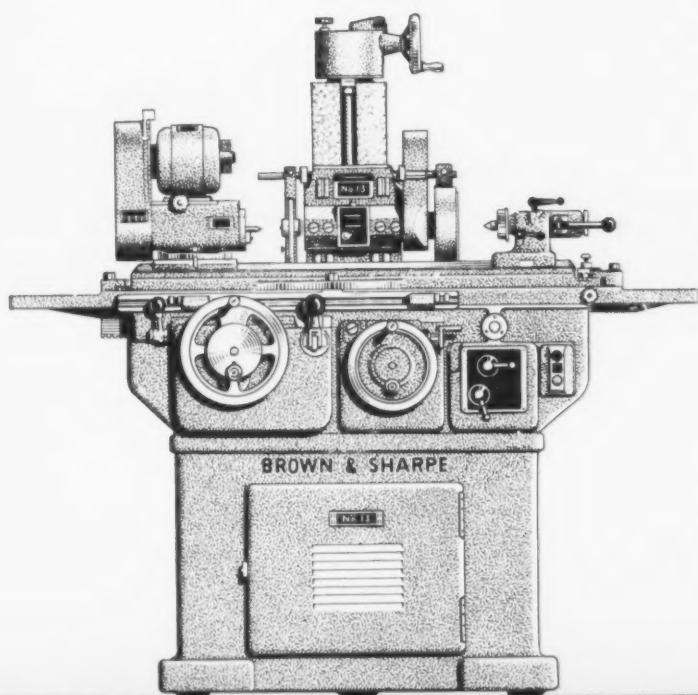
Steel City
Testing Machines Inc.

8843 LIVERNOIS • DETROIT 4, MICHIGAN



Productioneered

Equipment for Toolroom Grinding



With today's heavier production demanding more and faster tool sharpening and other regular toolroom grinding jobs, there is a constant risk of toolroom "bottlenecks". That is where Brown & Sharpe Machines and Tools can help. This modern equipment is especially designed with broad aspects of plant production in mind . . .

"Productioneered" with simplicity, flexibility and lasting accuracy to keep production flowing continuously.



Productioneered

for complete cutter and tool grinding service

**NO.10N CUTTER AND
TOOL GRINDING MACHINE
WITH UNIVERSAL
OR PLAIN EQUIPMENT**

The No.10N with Universal Equipment (illustrated) is a fast, accurate machine for complete cutter and tool sharpening, plus light cylindrical, internal and surface grinding. Roller-bearing table and simple, convenient controls are typical of many easy-handling features. The same basic machine with Plain Equipment provides equally high performance for cutter and tool sharpening only.



Brown & Sharpe





Productioneered
for unusually broad utility



**No.13 UNIVERSAL AND
TOOL GRINDING MACHINE**

Most versatile of the Brown & Sharpe grinding machines, this model is designed primarily for broad utility in the toolroom — but can also be speedily set up to care for limited over-flow of manufacturing work.

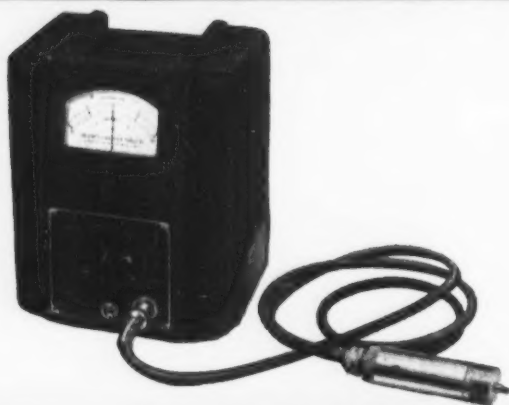
**No.5 CUTTER AND
TOOL GRINDING MACHINE**

Especially designed for fast, efficient sharpening of cutters and tools — particularly smaller cutters and end mills. Additional equipment is available to further speedup sharpening in quantity.



Productioneered
for quick sharpening of tools and cutters

BS *Productioneered*
to expedite high level output



ELECTRONIC MEASURING EQUIPMENT

This Brown & Sharpe Electronic Equipment permits precision gaging and inspection, at high speed, with human error practically eliminated.

It amplifies gage measurements 1800 to 18,000 times, enables operators to read ten-thousandths as easily as inches, as fast as parts can be handled. Invaluable in maintaining uniform quality at high output.

BS *Productioneered*
to save operators' time



PERMANENT MAGNET CHUCKS

Brown & Sharpe Permanent Magnet Chucks make the most of the skilled machinist's time by simplifying work-holding problems. A quick shift of a lever engages or disengages magnetic holding power. No electrical connections, no operating cost, nothing to cause heating. Clamps, vises, jigs and fixtures eliminated for many jobs. Wide variety of rectangular and rotary models available.

BS *Productioneered*
as aids to higher output



BROWN & SHARPE VISES

Brown & Sharpe Vises promote fast production through the quick, accurate setting and secure holding of precision work for milling, grinding or drilling — often eliminating the need for expensive jigs or fixtures. Made in Plain, Flanged, Swivel, Cam and Toolmakers' types.

WRITE FOR COMPLETE INFORMATION ON ANY OF
THE BROWN & SHARPE PRODUCTS LISTED BELOW

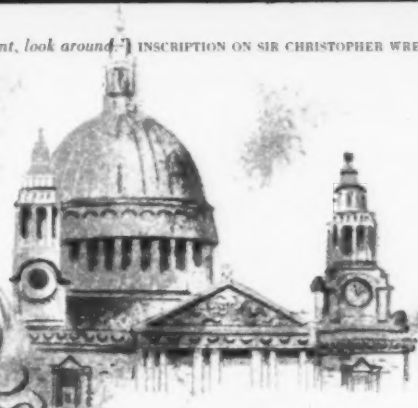
WE URGE BUYING THROUGH THE DISTRIBUTOR

Brown & Sharpe **BS**

Milling Machines • Grinding Machines • Screw Machines • Cutters • Machine Tool Accessories
Machinists' Tools • Johansson Gage Blocks • Electronic Measuring Equipment • Permanent Magnet Chucks • Pump

BROWN & SHARPE MFG. CO., PROVIDENCE 1, R. I., U.S.A.

"Reader, if thou seekest his monument, look around." INSCRIPTION ON SIR CHRISTOPHER WREN'S TOMB IN ST. PAUL'S CATHEDRAL

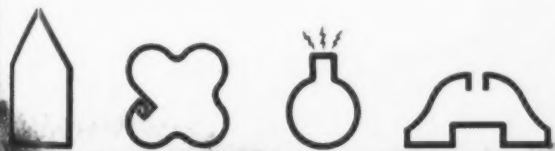
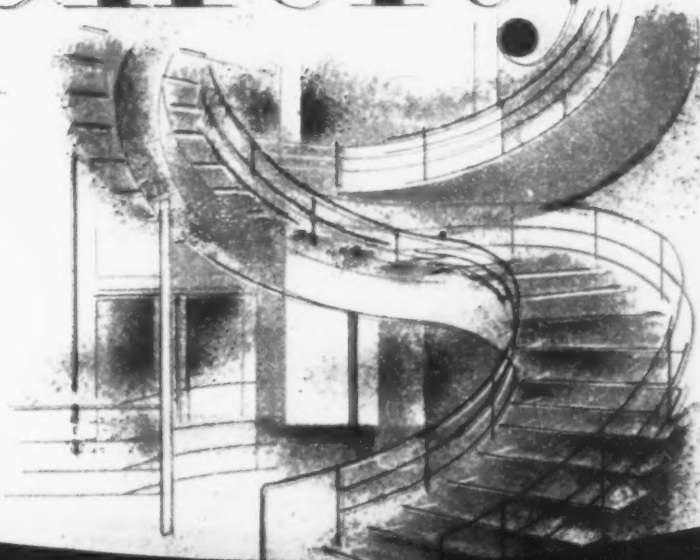


From the ashes of the Great Fire in 1666 emerged Sir Christopher Wren's masterpiece—St. Paul's Cathedral—with its soaring central dome "rising from the mists of London, like an Alpine peak". ★ In designing the dome, Wren solved with amazing simplicity one of the most difficult structural problems in architecture—how to support a great central dome without using excessively heavy and constricting crossing piers. ★ This same simplicity, combined with unusual structural engineering knowledge, enabled Wren to produce diverse effects in his many buildings without expensive elaboration.

simplicity

Whether hidden from sight doing a functional job,
or exposed to view just looking pretty,
Van Huffel metal shapes and tubing simplify
a lot of today's building problems.

★ Architects, designers and engineers know
they can incorporate in their designs strength without
excessive weight . . . economy without sacrificing quality
. . . and simplicity without complicated assembly.
That's why they are continually thinking up new uses.
That, too, is why they keep coming to Van Huffel
—where ideas take shape—in metal.



WELDED • LOCK SEAM • OPEN SEAM • BUTTED TUBING
• METAL SHAPES • MOULDINGS

VanHuffel

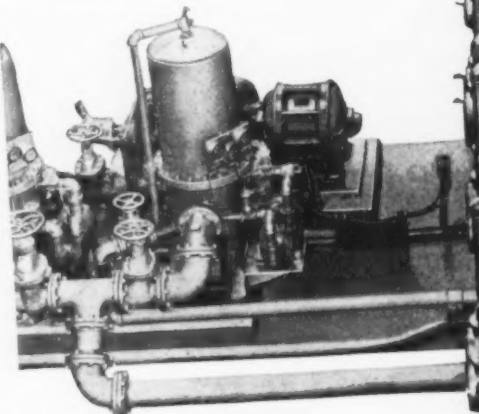
TUBE CORPORATION • WARREN, OHIO

How to save 300,000 pounds of molybdenum and 1,000,000 pounds of manganese

Molybdenum is now very scarce, and manganese is far from plentiful. So users of these materials, especially, will be glad to hear that our Spang-Chalfant Division in the past four years has been able to save thousands of pounds of essential resources. The savings were made by heat treating carbon steel casing to give it high strength characteristics similar to those of alloy steel casing.

Since September, 1947, our Spang-Chalfant Division produced over 5½ million feet of high strength pipe by this process. But more important than past production may be our development's effect on future supplies of casing. Even if all molybdenum is restricted from oil field use, we will be able to produce up to 3,500 tons of high strength casing per month without it.

Research in the fields in which National Supply operates requires a great expenditure of time and money. When it pays off for our customers and for the nation as it has in the heat-treating of pipe, we consider it an excellent investment.



HEAT TREATING takes the place of scarce alloys

High strength casing, used in deep oil wells, usually is made of alloy steel containing molybdenum and manganese. Many years ago our engineers tested the idea of making it out of ordinary carbon steel, then heat treating it to give it the required ductility and strength characteristics. The difficult problem was to hold the shape of the pipe during heat treating . . . and about five years ago we learned how.

We pass carbon steel casing through the series of special, barrel-type furnaces shown here, which operate at 2800-2900 degrees. They quickly heat the pipe to 1600 degrees. Then we quench it in a high-pressure water spray, reheat it to 1100 degrees and allow it to cool. The finished pipe has the ductility and strength of alloy steel pipe, but it requires no molybdenum and less manganese in its manufacture.



THE NATIONAL SUPPLY COMPANY

Executive Offices: Pittsburgh, Pennsylvania

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

Reprinted from WALL STREET JOURNAL

This **SELAS** Customer
Takes Pride In A Great Achievement

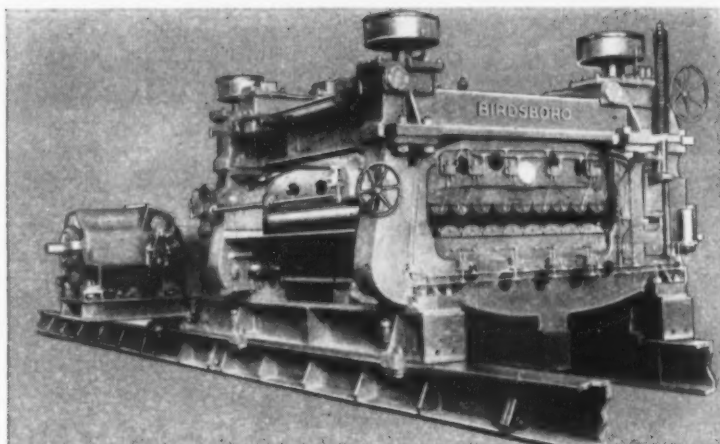
We too are proud—
to have supplied
equipment for heat
processing...from heat,
to quench, to draw.

See the newest developments in heat
processing...discuss your problems with
Selas Engineers at the Metal Show
Space 1601



SELAS CORPORATION OF AMERICA
PHILADELPHIA 34, PENNSYLVANIA

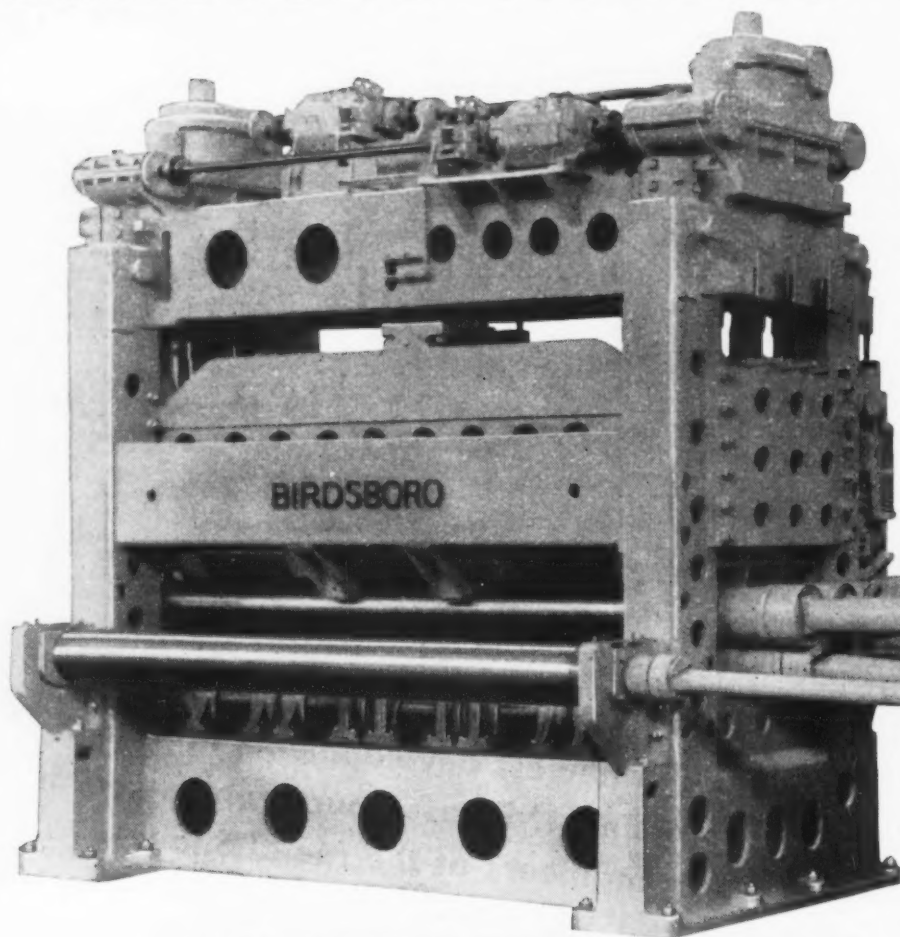
Heat Processing Engineers for Industry • Development • Design • Manufacture



Leveling machine for hot carbon plate 3/16" to 1/2" x 100" wide.

STEP UP YOUR OUTPUT--cut down your costs

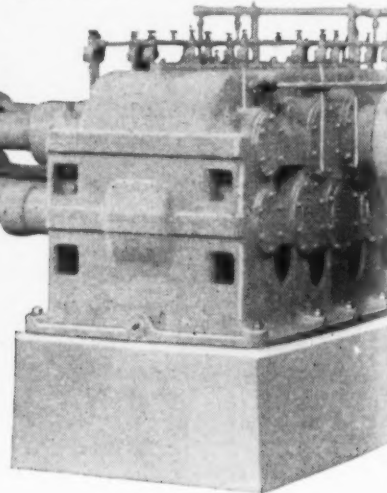
BIRDSBORO LEVELING MACHINES



On any leveling job—from heavy cold armor plate to light hot carbon plate—it takes smooth-running, maintenance-free levelers to produce volume output at minimum cost. Birdsboro precision levelers are designed, engineered, and built with this point in mind.

At your request, Birdsboro Engineers will put a diversity of design and engineering experience to work on your application to help you get the results you want.

Precision leveler for cold alloy steel plate up to 1" thick and 160" wide.



BIRDSBORO

STEEL FOUNDRY & MACHINE CO.

Birdsboro, Penna.

**STEEL MILL
MACHINERY**

Designers and Builders of:

Steel Mill Machinery • Crushing Machinery • Rolls
Hydraulic Presses • Special Machinery • Steel Castings

Offices in:
BIRDSBORO, PA. and PITTSBURGH, PA.

MM-28-52



The Fable of The Cat and the Fox"

**carries a lesson for
Cutting Fluid users**

The Fable . . . with apologies to Aesop!

"I am so smart", bragged the Fox to the Cat, "that I know a hundred tricks to escape a pack of dogs."

"Alas", said the Cat, "I know but one way of escape."

"Poor you, too bad you're not as clever as I am", the Fox answered, scornfully.

Just then a pack of hounds came over the hill headed right for the Cat and the Fox. The Cat took to a tree, its lone, but sure, way of escape. And, the Fox? Despite its hundred tricks of evasion, it was finally caught and killed.

The Lesson . . .

Like the Cat in Aesop's fable, a cutting fluid that best meets a given set of conditions will prove most successful in the long run. A cutting fluid designed to do a hundred jobs may not be the best answer to any. By recommending the

cutting fluids best qualified to meet *your* requirements, D. A. Stuart Oil Co. saves you time, money and materials, gives you the optimum relationship between finish, tool life and output on every machining job.

More Than a "Coolant" is Needed

D.A. Stuart Oil co.
EST. 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2737 S. Troy St., Chicago 23, Ill.

FILL IN COUPON — CLIP TO YOUR LETTERHEAD

and mail to D. A. Stuart Oil Co. Ltd.

2737 S. Troy St., Chicago 23, Ill.

for your copy of "More Than a Coolant is Needed"

Name

Title

TO CUT COSTS...ever think of



Only **CARBO** TRADE

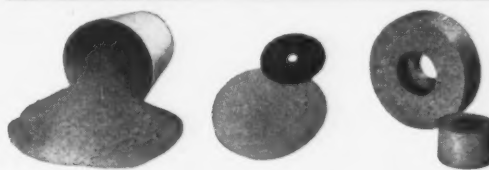
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, New York.

switching to an abrasive BELT?

Grinding and polishing techniques have undergone major improvements in the past few years. One of many revolutionary developments is the "61" contact wheel, used with a coated belt on many operations previously performed with a bonded or a set-up wheel. In every case, the change has been made for just one reason—to yield a better result at a lower cost.

This is the kind of change that spells progress to every metalworking man who is battling against higher and higher costs. And this is the reason why you should welcome the CARBORUNDUM man or distributor salesman when he calls on you. There is nobody quite like him, for he's not in the position of having to back just one type of product, or two. He alone has the ability to help you specify the one RIGHT combination of abrasive product and abrasive method for every operation in your shop.

His counsel is experienced, practical, and above all completely free from bias—for he represents the only complete line of abrasives, from CARBORUNDUM, the world's best known brand name in abrasives. We suggest that you call him in today—it's to your profit!



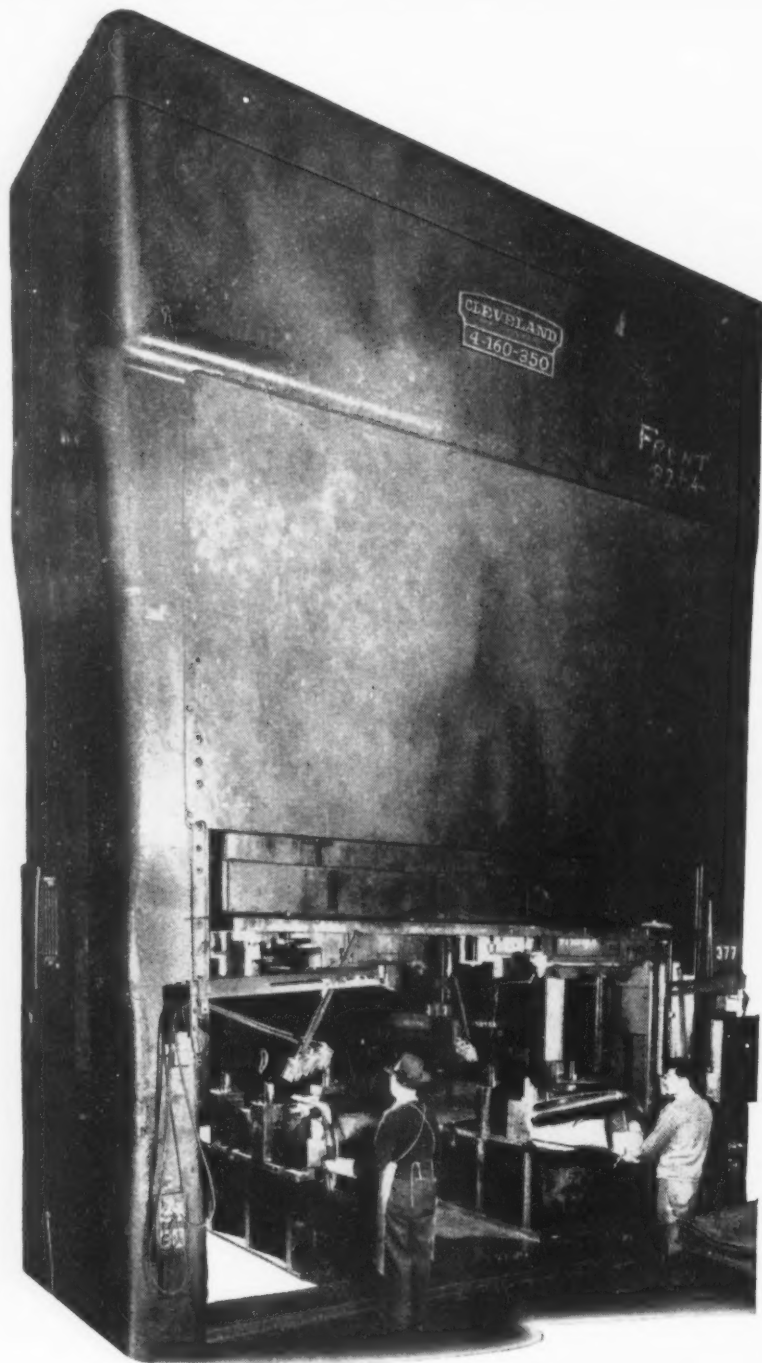
Here are only a few of the 30,000 reasons why you get the RIGHT combination of abrasive and method only from CARBORUNDUM



CARBORUNDUM

MARK

offers ALL abrasive products...to give you the proper ONE



Four-Point Press, 850 Tons Capacity

BIG...

IN PERFORMANCE TOO!

Certainly when you buy a press you want one large enough with the necessary capacity to handle assigned jobs, but don't stop there—size isn't everything. Be sure that you get a press whose frame is designed to "take it" under the strain of continuous operation and occasional overload; a press with long enough gibbing to assure slide accuracy and protect die-life. Get a press equipped with a clutch that offers positive control, requires only occasional, easy-to-make adjustments and is economical to operate. In other words—get a CLEVELAND!

A-4249

PUNCHING TOOLS & DIES

OFFICES AT:
NEW YORK... CHICAGO
DETROIT... PHILADELPHIA
E. LANSING

**THE
CLEVELAND
PUNCH & SHEAR WORKS CO.
U. S. A.**

Established 1880

..... **POWER PRESSES**

FABRICATING TOOLS

CLEVELAND 14, OHIO

Steel Is First
To Make
Things Last



Beauty Treatment for Your bathroom

Bet you can't guess how little it would cost to make *your* bathroom as pretty and practical as this one.

That is, unless you already know about steel wall tile. How smart it looks. How it protects the beauty it adds. How reasonable it is to purchase and install. Because all the wall tile in this delightful room is made of steel, America's great and versatile bargain metal.

Even better for your bathroom, this wall tile is made of *Weirzin*—the electrolytically zinc-coated steel that is fireproof . . . resists moisture . . . forms a lasting bond with its finish . . . safeguards beauty permanently.

It doesn't matter whether it's wall tile or lighting fixtures, Venetian blinds or cabinets—whatever you buy, you come out ahead with steel. Make steel *your* standard—and save.

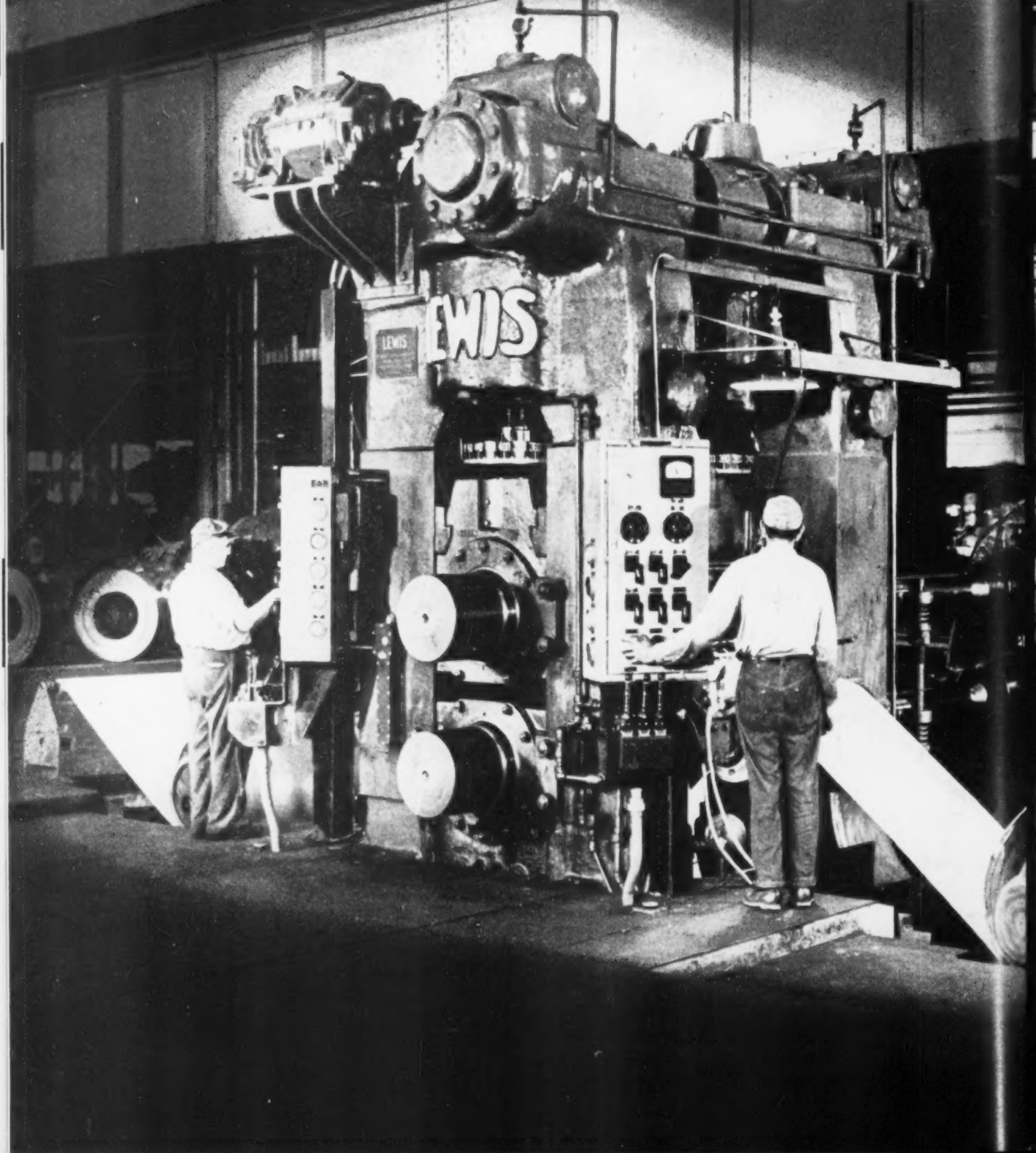


Metal sculpture executed in Weirzin demonstrates the exceptional workability of this easily fabricated metal.

WEIRTON STEEL COMPANY WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

LEWIS



ROLLING MILL EQUIPMENT....

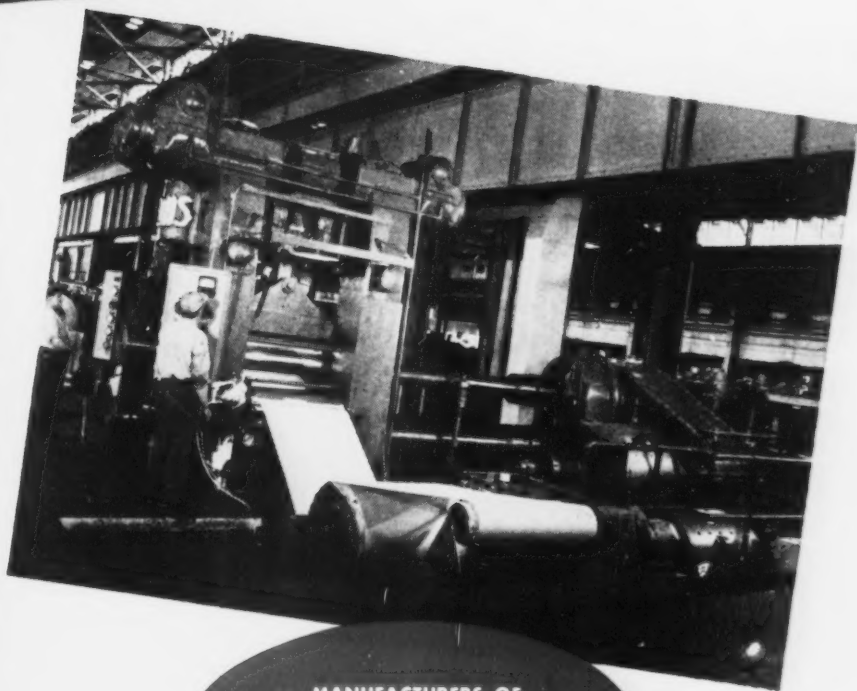


A Lewis 28 x 42 inch two-high skin pass mill at the West Leechburg plant of Allegheny Ludlum Steel Corporation.

This mill will handle stainless steel strip in coils up to 60 inch diameter and 15,000 lb. weight.

The mills are equipped with motorized screw-down, roller bearing rolls, Universal type spindles and motor-operated sled type roll changer.

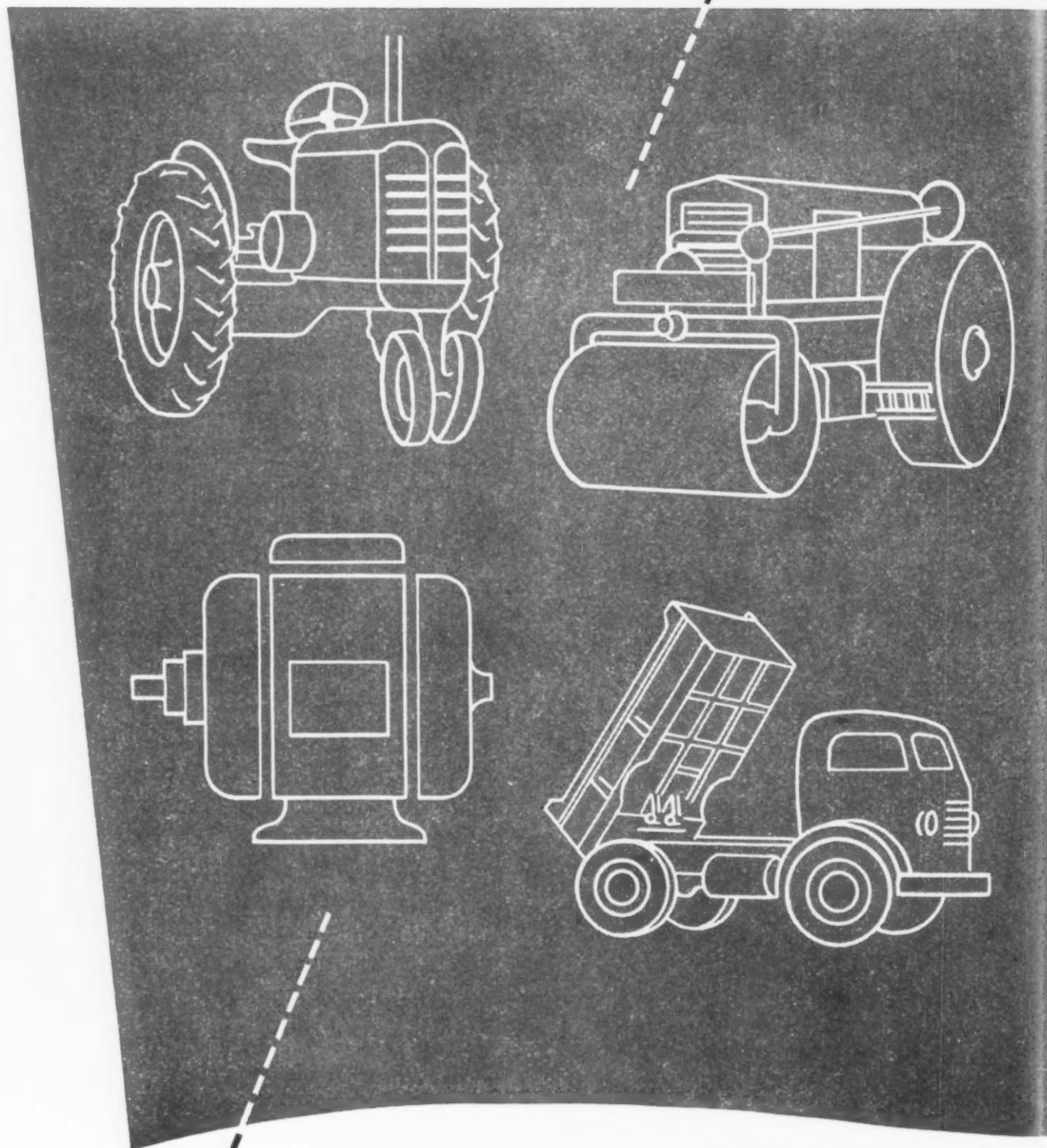
This installation is typical of rolling mill equipment which Lewis furnishes the iron, steel and non-ferrous industries. Inquiries are always welcomed.



MANUFACTURERS OF
ROLLS AND ROLLING MILL EQUIPMENT
FOR THE IRON, STEEL AND
NON-FERROUS
INDUSTRIES

LEWIS FOUNDRY & MACHINE
DIVISION OF BLAW-KNOX CO., PITTSBURGH, PA.

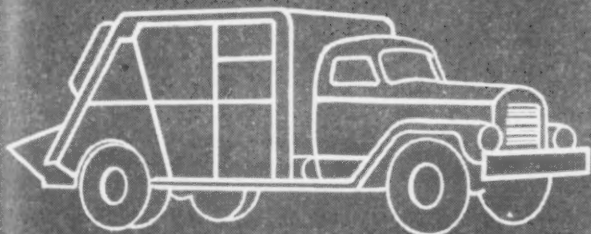
Lowe Brothers **ZINOXIDE** produces a better



* Because it adheres perfectly to all types of metal—even *aluminum*—and because of its many other features of fast-drying, smoothness and durability—ZINOXIDE is the ideal primer for steam rollers, electric motors, dump trucks, tractors and many, many other products.

Primer finish at ½ the cost!

*...proved by
recent case
history!*



Here are the outstanding
ZINOXIDE features
which combine to make
amazing economy
and top finishing
results possible!

A large, well-known manufacturer of load packers* wanted to reduce finishing costs without sacrificing quality of the finished product. A Lowe Brothers "Finishing Specialist" recommended that this manufacturer replace his one-coat operation with a two-coat system incorporating new ZINOXIDE primer and a finishing coat of enamel. ZINOXIDE was put to the test, and an intensive time study revealed that the new system slashed 50% off material and application costs! What's more, a better looking finish resulted—a better wearing finish, too, for ZINOXIDE gave better "hold out" on the enamel!

1. Adheres perfectly to all types of metal—and that includes aluminum! **2.** Dries to handle in 15 minutes! Can be baked at 300° for 15 minutes or more. **3.** Eliminates bad after-effects of "overspray"—no rough primer surface to sand before finishing! **4.** Durable! Castings primed with ZINOXIDE can be stored outside without rusting. Pigments used are best rust inhibitors known. **5.** ZINOXIDE can be recoated quickly with lacquer or any type of enamel!

Perhaps ZINOXIDE is just what you've been needing to bring new finishing efficiency and finer results. Certainly worth finding out, isn't it? Ask a Lowe Brothers "Finishing Specialist." Write today.

THE LOWE BROTHERS COMPANY • Dayton 2, Ohio
Industrial Division

This advertisement is based
on facts from Lowe Brothers
industrial case history files.



Lowe Brothers
FINISHES FOR INDUSTRY

NEW

ALL-STEEL

DODGE-TIMKEN PILLOW BLOCKS

Rugged!

—FOR HEAVY DUTY
SERVICE!

Compact!

—LESS SPACE!
LESS WEIGHT!

HERE are the bearings for industry's toughest jobs—in the most compact and rugged "package."

High radial and thrust capacities. Stamina to take heavy shock loads. All-steel construction that packs this load-carrying capacity into less weight and less space than ever before.

This brilliant achievement has been accomplished through pooling the engineering resources and bearing-building experience of Dodge and Timken. This new line so completely fills a need that engineers are already specifying "Dodge-Timken All-Steel" for some of America's heaviest machinery and largest industrial projects.

Completely assembled, permanently adjusted, lubricated and sealed at the factory, these All-Steel pillow blocks are shipped ready to go to work—wherever in industry the going is tough!

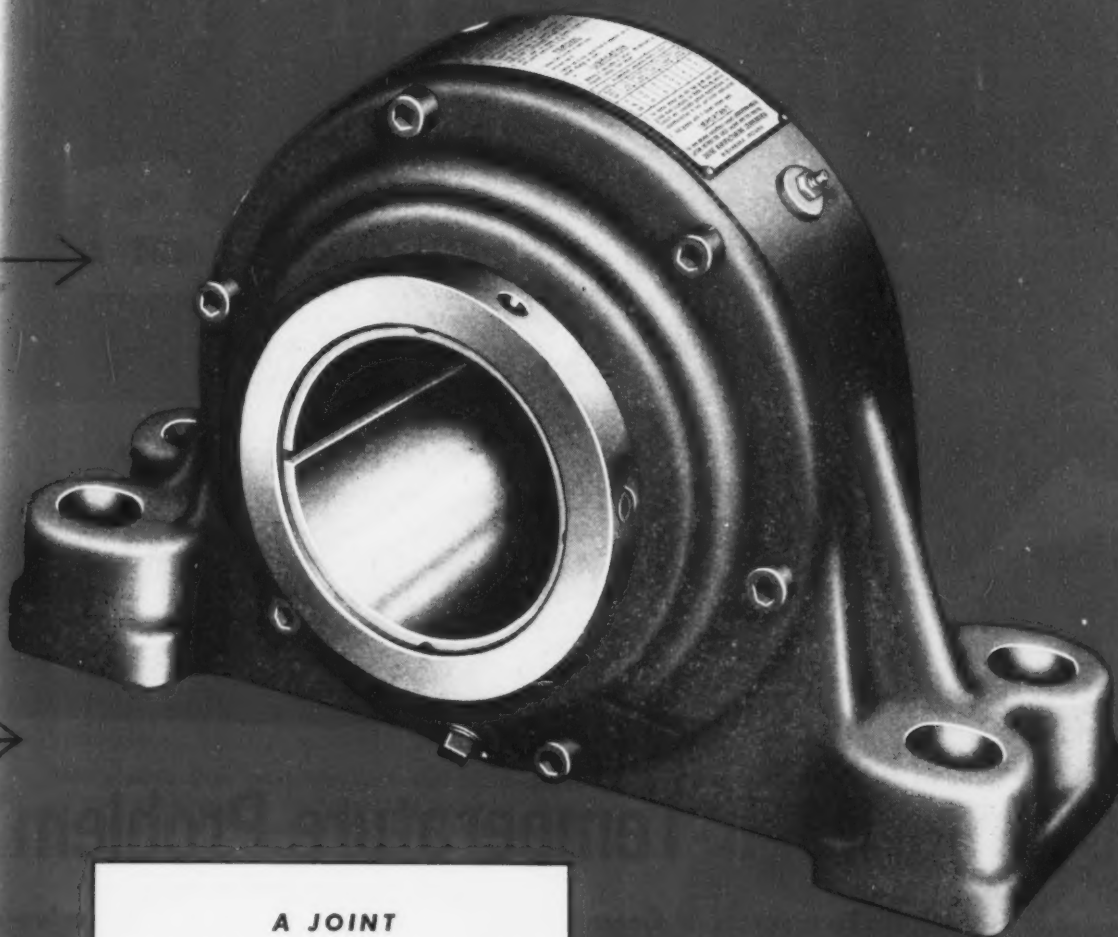
For detailed information and delivery dates write to Dodge, or call your Dodge Distributor.

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER
your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified telephone directory.





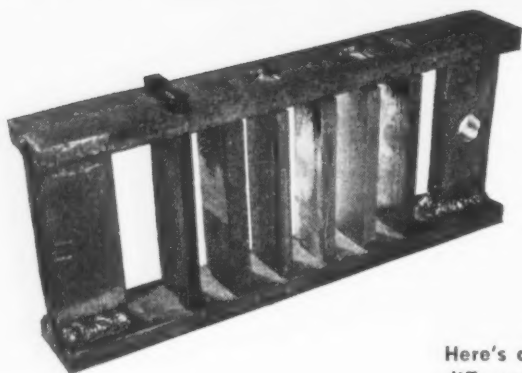
**A JOINT
ENGINEERING DEVELOPMENT
BY DODGE AND THE
TIMKEN ROLLER BEARING
COMPANY**



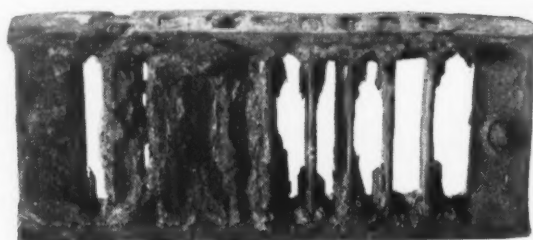
SHAFT SIZES: 2¹⁵/₁₆ to 10 in.

- All-Steel construction
- A new Timken bearing design
- High radial and thrust capacities
- Compact—minimum dimensions
- Minimum weight; maximum strength
- Fully self-aligning with spherical outer race
- Both expansion and non-expansion types
- Adapter mounting, proven through the years
- Double piston ring seals
- Sealed both on and off the shaft
- Fully assembled, permanently adjusted, lubricated and sealed at the factory

DODGE MANUFACTURING CORPORATION, 800 Union St., Mishawaka, Indiana



Here's a before and after photo of a test rack of different alloys. The "after" photo (below) shows how the alloys reacted with exposure to high-temperature corrosion in this particular test. It's through tests like this that Inco's High-Temperature Corrosion Engineers are able to determine the material to recommend for special operating conditions.



What's Your High-Temperature Problem?

Inco High-Temperature Corrosion Engineers want to help you solve it.

Anyone working with the higher operating temperatures has undoubtedly run into the common problem of equipment failure.

Engineers have found that corrosion quickly spells death to many metals when the temperatures mount.

That's why Inco established a special High-Temperature Engineering Service to search out and determine what materials would stand up best under unusual corrosive conditions at high temperatures.

You can see some of the results of their tests in the heat-treating, glass, chemical, petroleum, aeronautical and power industries when you visit the

National Metals Exposition at Convention Hall in Philadelphia, October 20-24. Inco's booth is 324; drop around and visit. There'll be Inco High-Temperature engineers on hand to discuss your problem with you.

They may have the answer you are looking for — if not, you can be sure they will attempt to get it as soon as possible.

So remember Inco's booth number — 324—at the National Metals Exposition.

Or, send today for your free copy of the High-Temperature Work Sheet. It is a specially developed simplified form to aid you in setting down your problem so that our engineers can go to work on it.



THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

HY-TEST

the **ONLY** Safety Shoes with

BoL Tan®

Sweat-resistant Leather Insoles!

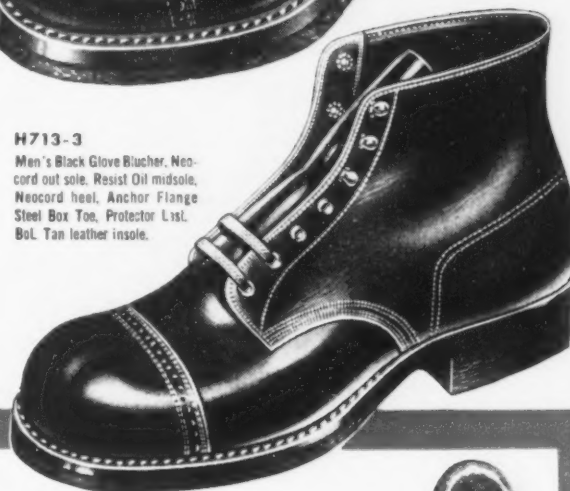
H754-4

Men's 4 inch Brown Glove Blucher, Neocord outsole, Leather midsole, Neocord heel, Anchor Flange Steel Box Toe, Protector Last, BoL Tan leather insole.



H713-3

Men's Black Glove Blucher, Neocord out sole, Resist Oil midsole, Neocord heel, Anchor Flange Steel Box Toe, Protector Last, BoL Tan leather insole.



ADD UP TO TWICE THE WEAR!

No other safety shoe offers the benefits of the exclusive, new *BoL Tan* sweat-resistant leather insole. HY-TEST Safety Shoes now increase worker comfort and productiveness with *BoL Tan* leather insoles in every pair.

The life of any shoe depends on the insole. That's why *BoL Tan* sweat-resistant leather insoles extend shoe life as much as 100%, because they withstand the damaging effects of foot perspiration.

This means that your workers and all wearers of safety shoes can increase the value of their purchases and be more comfortable while at work when they buy and wear HY-TEST SAFETY SHOES.

Only the BoL Tan leather insole resists the damaging effects of perspiration!

AT NO EXTRA COST!

Here are two insoles from a single pair of shoes worn in a foundry for seven months. The one from the left shoe is a *BoL Tan* leather insole; the other is a regular quality leather insole.



Note the *BoL Tan* leather insole is still soft and pliable, shown by cut section lifted for inspection!

Ordinary insole is cracked, curled, saw-edged...dried out and damaged by perspiration attack!

The *BoL Tan* leather insole stays comfortable, permits re-soling when ordinary insole would have failed!

Ordinary insole is unfit for further wear causing discard of shoe long before uppers are worn out.



Use this handy coupon for details on HY-TEST's *BoL Tan* leather insoles

HY-TEST SAFETY SHOES, Dept. I-10
Division of International Shoe Company
St. Louis 3, Missouri

Please send me free copy of your folder explaining the advantages of *BoL Tan* leather insoles.

Name.....

Firm.....

Address.....

City.....Zone.....State.....

HY-TEST

ANCHOR
FLANGE®

SAFETY SHOES

*TRADEMARK REG. U. S. PAT. OFF.

The World's Largest Selling Safety Shoe

Division of International Shoe Company, St. Louis 3, Mo.

New York Office: Suite 1708, 225 W. 34th St.

NOW... A COMPLETE Thor AIR



1/4" Capacity, 4 Models
Offset or Lever Handle



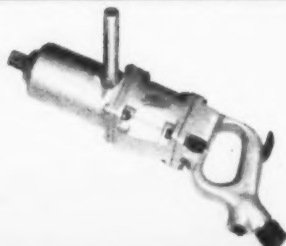
3/8" Capacity, 4 Models
Offset or Lever Handle



3/8" Capacity, 4 Models
Side or End Grip Handle



3/4" Standard Duty, 2 Models
Side or End Grip Handle



3/4" Heavy Duty
Grip Handle



1 1/4" Heavy Duty
End Grip

S P E C I F I C A T I O N S

ON THE NEWEST, HARDEST-HITTING AIR IMPACTS AVAILABLE TODAY!

Optional square drive spindle or quick change chuck (integral with spindle) on sizes up to 3/4" Heavy Duty.

TOOL SIZE	BOLT SIZE CAPACITY	WEIGHT POUNDS	TYPE THROTTLE HANDLE	LENGTH OVERALL	SPINDLE SQUARE
16	1/4"	3-5/8	OFFSET	7-5/8"	3/8"
16S	1/4"	3-13/16	OFFSET	8-11/16"	3/8"
16L	1/4"	3-1/2	LEVER	8-3/8"	3/8"
16LS	1/4"	3-11/16	LEVER	8-7/16"	3/8"
24	3/8"	5-3/4	OFFSET	8-11/16"	1/2"
24S	3/8"	6	OFFSET	9-13/16"	1/2"
24L	3/8"	5-3/8	LEVER	10"	1/2"
24LS	3/8"	5-9/16	LEVER	11-5/8"	1/2"
40	5/8"	12-3/4	OFFSET	10-1/2"	5/8"
40S	5/8"	13	OFFSET	11-5/8"	5/8"
40G	5/8"	13-1/2	END GRIP	15-5/16"	5/8"
40GS	5/8"	13-7/8	END GRIP	16-7/16"	5/8"
48	3/4"	13-1/2	OFFSET	11"	3/4"
48G	3/4"	14-1/2	END GRIP	15-1/2"	3/4"
48HG	3/4"	20-1/4	END GRIP	18"	1"
20	1 1/4"	33-1/2	END GRIP	16-3/8"	1"

NEW LINE OF.....

IMPACT WRENCHES

EXTRA LARGE SPRING outside impact mechanism, means faster action, longer spring life.

Exclusive new "rolling ball" cam drive operates at any angle under any conditions. Draws threaded fasteners down faster and tighter BEFORE IMPACTING for measurably longer tool life!

FINEST GRADE TOOL STEEL throughout operating parts . . . in the Thor tradition of "more for your money!"

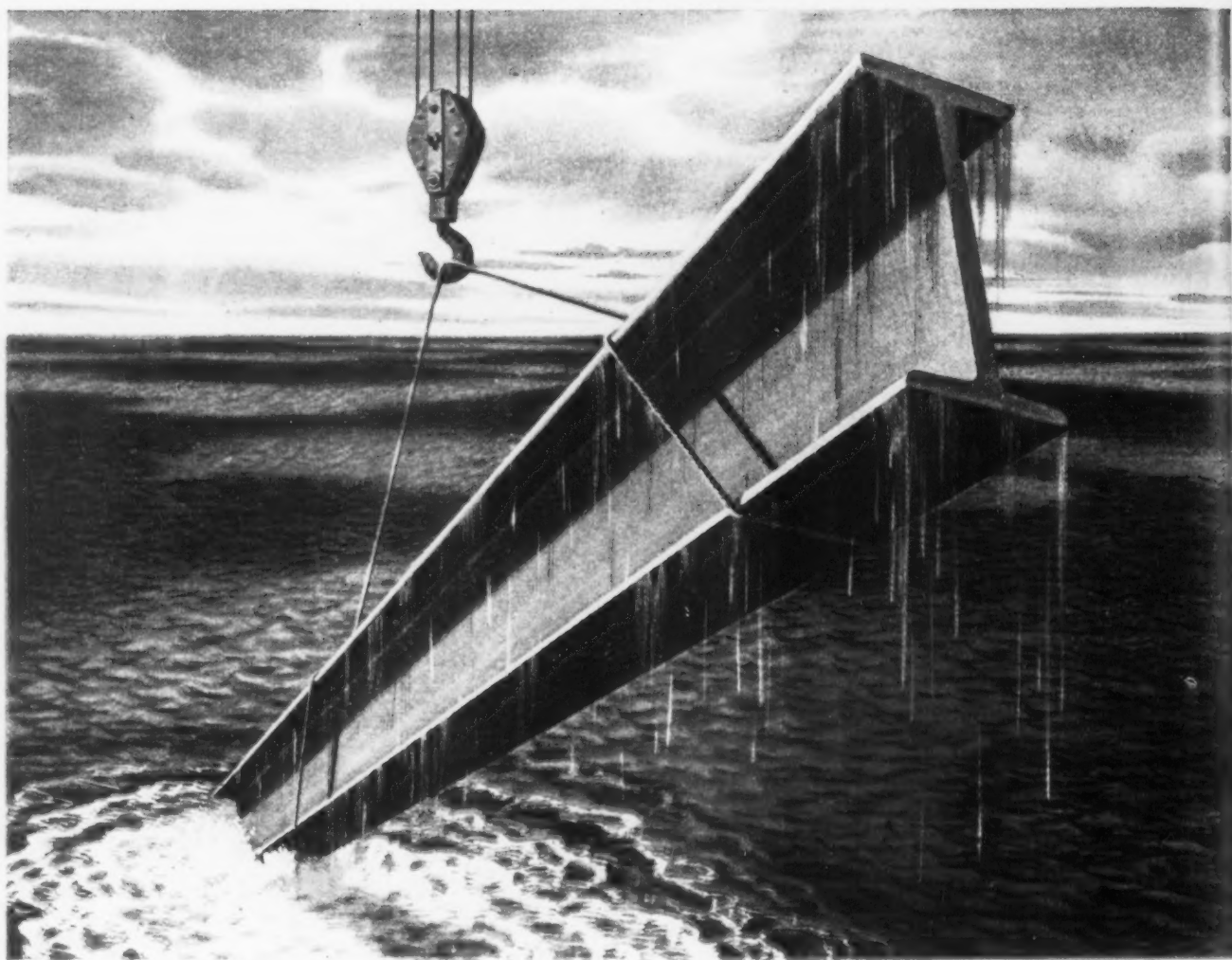
WIDE RADIUS IMPACT BLOW accumulates more leverage, multiplies, applies power for top efficiency

LESS "LIFTING" ACTION, more STRIKING action per pound of delivered motor power.

"ROTA-TYPE" impact jaws present new surface for every blow for indefinitely long life.

Thor is really in the Impact Wrench business with this great new line of hard-hitting tools for production and maintenance applications. Geared for quick delivery and ready for any test, Thor invites inquiries on any or all of the 19 sizes built to speed your operations and save you worthwhile money. Contact your nearby Thor branch office or write Independent Pneumatic Tool Co., Aurora, Ill.





Sea water...secret of more steel!

THE secret of improved open hearth furnace bottom performance — and increased ingot production for you — is high purity periclase derived from sea water magnesia.

Higher in MgO, lower in impurities, this sea water *periclase* is the heart of Permanente 165 ramming mix.

Proved superior by many of the industry's most progressive companies, Permanente 165 *retains highest strength at operating temperatures* — gives maximum refractoriness and maximum resistance to chemical attack.

Pre-shrunk for high density, the sea water periclase of patented Permanente 165 is bonded to *full depth* by crystal bridging — a solid phase reaction.

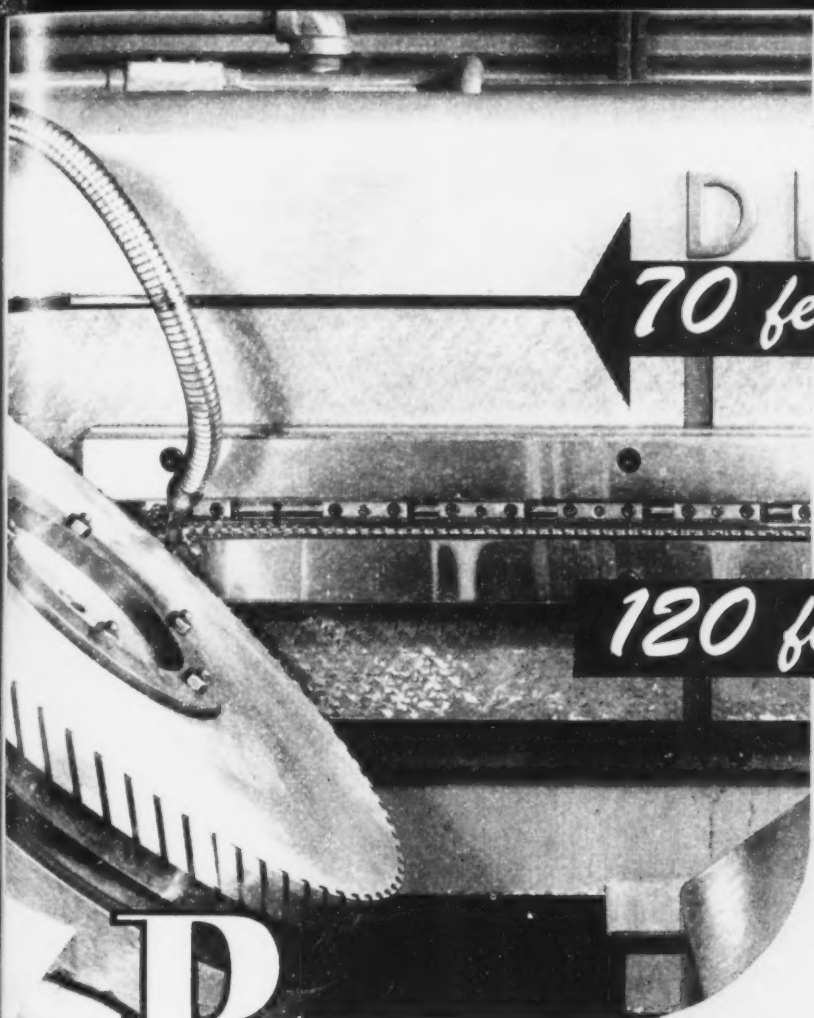
Result: protection from costly breakthroughs, less down-time for repairs between heats, more tonnage per year!

YOUR Kaiser refractory engineer will give prompt attention to your refractory problem — will offer, where desired, research, design and installation service to give you maximum production most economically. Write for descriptive literature on Permanente 165 and on the companion ramming mix, Permanente 84. Principal sales offices: *Chemical Division, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.*

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesite • Magnesia • Alumina • Periclase



70 feet per minute

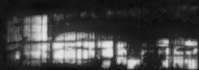
120 feet per minute

Broaching compressor wheel slots

Broaching intricately formed slots in aluminum compressor wheels at a speed of 70 feet per minute — with a return stroke of 120 feet per minute — is a practical reality at Detroit Broach. This great broaching advancement is the result of imagination and sound broach-engineering experience . . . a combination forged by years of creative engineering and manufacturing of broaches and broaching tools exclusively.

Whether your application involves a new concept in broaching or the simplest type of conventional broaching, these same factors will benefit you in terms of broaching economy and dependable tooling when you call on Detroit Broach.

WORLD'S LARGEST MANUFACTURER OF BROACHES AND BROACHING TOOLS EXCLUSIVELY

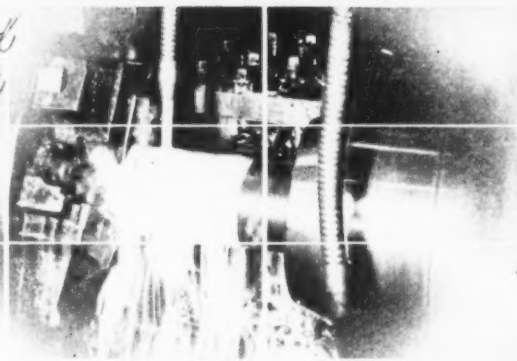


DETROIT BROACH COMPANY

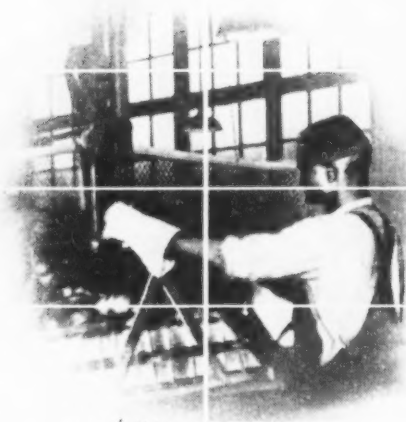
20201 SHERWOOD AVE.

• DETROIT 34, MICH.

*Coolants and
lubricants for
MACHINING*



*drawing
lubricants for
FORMING*

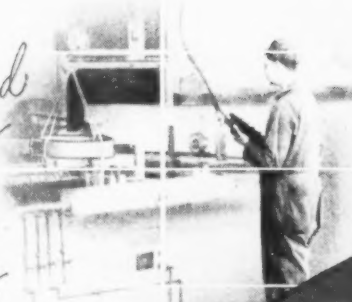


*Compounds
for metal
CLEANING*

*core oils for
CASTING*



*salts and
quenching
oils for
HEAT
TREATING*



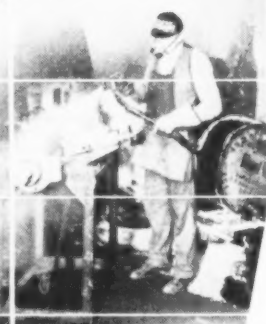
LET HOUGHTON HELP YOU GET MORE

NEW HOUGHTON PROCESSING AIDS

- ☐ Want a single water soluble cutting base that will handle 90% of all machining jobs?
- ☐ Or, an additive for water used in grinding, that will inhibit against rust?
- ☐ Or, a rust preventive film so thin you can't see it, yet protective for such long periods?
- ☐ Or, a quenching oil faster in quenching speed than any oil medium yet developed for lean alloy steels?
- ☐ Or, a phosphate cleaner that cleans and protects . . . aids paint adherence?

Check any item on which you want full data, sign in the margin of this page, and mail to E. F. HOUGHTON & COMPANY, 303 W. Lehigh Ave., Philadelphia 33, Pa.

*inhibited
Coatings for
RUST
PREVENTION*



Houghton on-the-job service brings you results

No one knows your production problems as intimately as you do. But Houghton on-the-job Service can often add something to your experience that will result in a quicker and more satisfactory answer. This on-the-job Service is rendered right out in your shop by your Houghton Man. He is constantly meeting up with a wide variety of problems as he is called into metalworking plants. You not only get the benefit of his extensive experience in getting to the crux of the problem, but back of him is the Houghton organization with 80 years of research and development work. If he doesn't know the answer—he'll get it from our technical staff. Have your Houghton Man take a look at your metalworking operations. A lot of plant managers are finding that this simple step brings surprising results.

OUT OF YOUR PRODUCTIVE CAPACITY

You'll get more efficient operation the Houghton way

Houghton is not just a line of products. Over the years, Houghton research has constantly been finding new ways to improve processing in metalworking plants. It is these new ways and new methods that you benefit from, along with many specially formulated products, when you work with Houghton. Many a plant like yours is finding it possible to relieve production bottlenecks—and bring down costs—with the aid of Houghton "job tailored" products and experience.

Helpful data makes Houghton products easier to use

Three generations of Houghton men, plus an active and continuing program of product and application research, have given us a lot of useful data and information. Much of it has been put into printed form to make Houghton products easier to use. If your problem concerns metalworking operations, it's safe to say that we have produced data sheets, reports, booklets—even textbooks—that will help you. Ask the Houghton Man.



Get the latest Houghton Product Index listing all Houghton products used regularly by metalworking plants. Ask the Houghton Man for a copy or write to E. F. Houghton & Company, Philadelphia 33, Pa.

E. F. HOUGHTON & CO.
PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO



**Ready to give you
on-the-job service . . .**



FOR SPECIALTY WIRE...

a
**Specialty
Mill**

*"JOHNSON Sets
the Standard
for the Industry"*

Johnson has pioneered in the development of laboratory control of all operations—automatic temperature controlling devices, precision made dies, standardized lubricants. And, with Johnson as your source of supply, you are assured the latest refinements in the drawing of high tensile steel wire.

JOHNSON

JOHNSON STEEL and WIRE CO., INC.

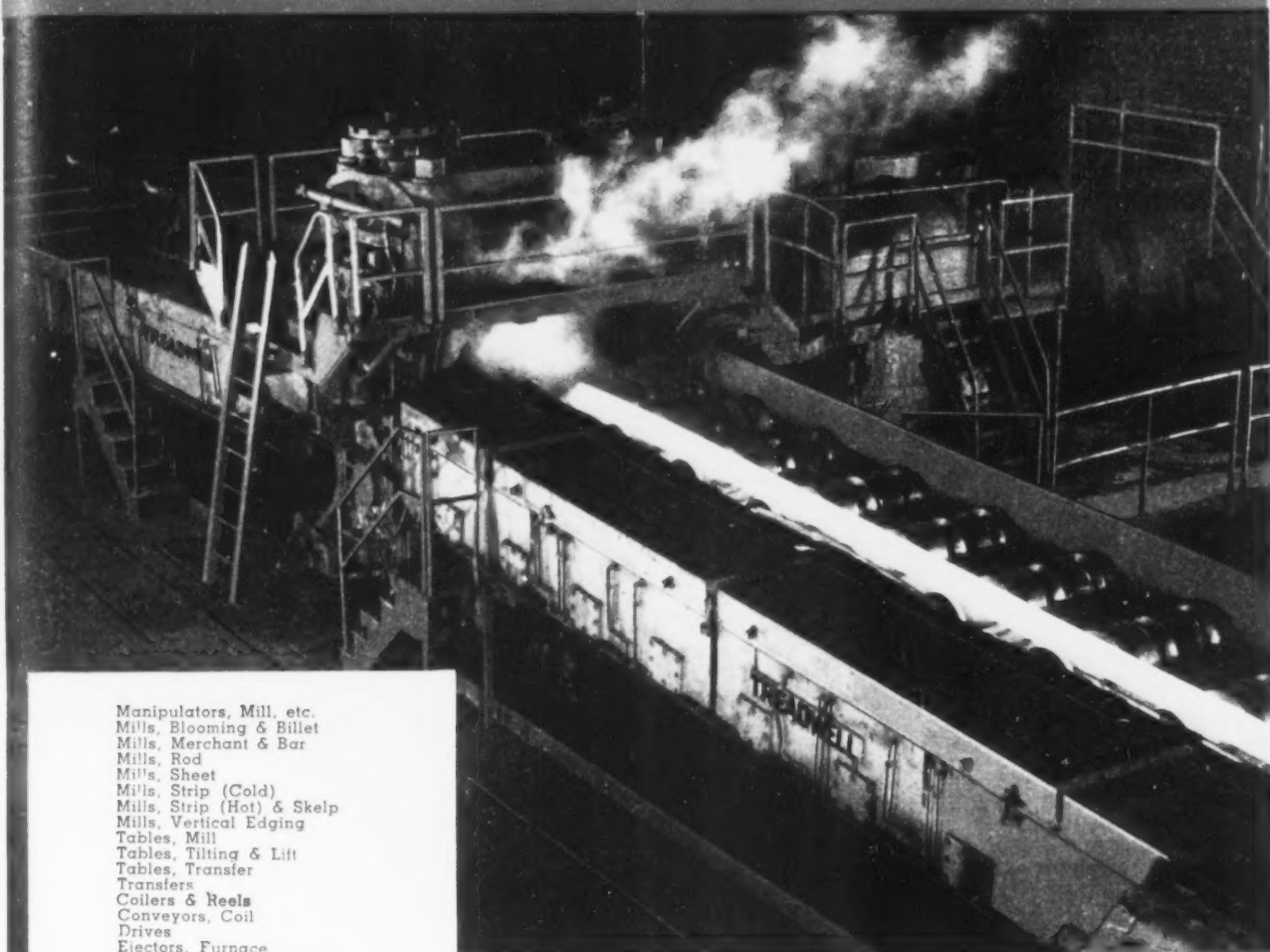
Worcester 1, Massachusetts

New York Pittsburgh Philadelphia Detroit Akron Chicago Atlanta Houston Tulsa Los Angeles



SUBSIDIARY OF PITTSBURGH STEEL COMPANY

Treadwell



Photograph Courtesy Jones & Laughlin Steel Corp.

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers
Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.
Beds, Cooling
Beds, Inspection
Bumpers, Furnace
Pushers, Furnace
Repeaters
Handling Equipment (Kick-offs,
Pilers, Cradles, etc.)
Steel and Iron Castings
Ni-Hard and Ductile Iron
Castings

40' long 28" three-hi mill tilting tables for diamond and square pass rolling of bars, billets and blooms. Material automatically manipulated from pass to pass with manipulators. Our Engineers will be glad to discuss your mill problems with you.



Treadwell Engineering Company

EASTON, PA.

SALES AND ENGINEERING OFFICES:

208 S. LA SALLE STREET
CHICAGO 4, ILL.
Central 6-9784

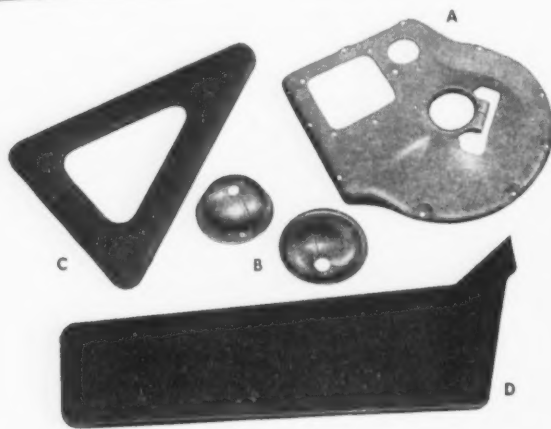
140 CEDAR STREET
NEW YORK 6, N. Y.
Worth 4-3344

1217 FARMERS BANK BLDG.
PITTSBURGH 22, PA.
Atlantic 1-2883

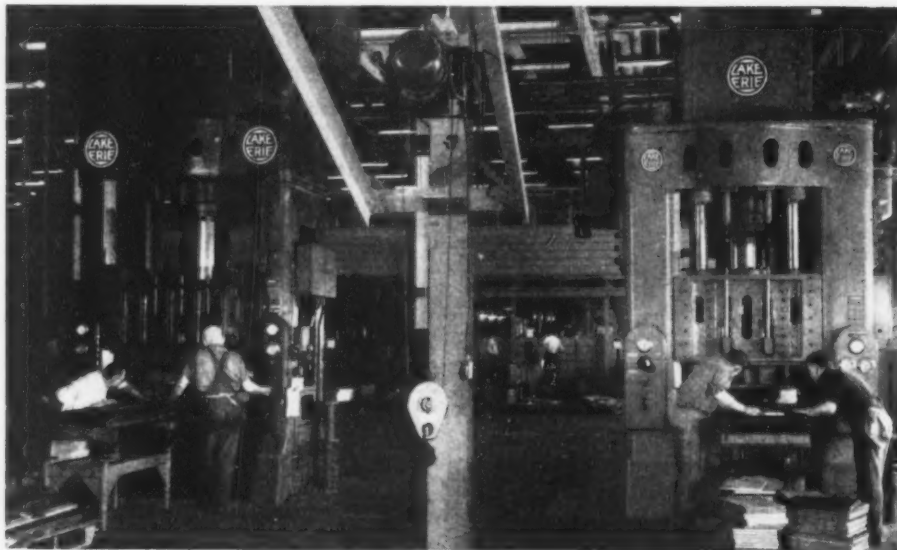
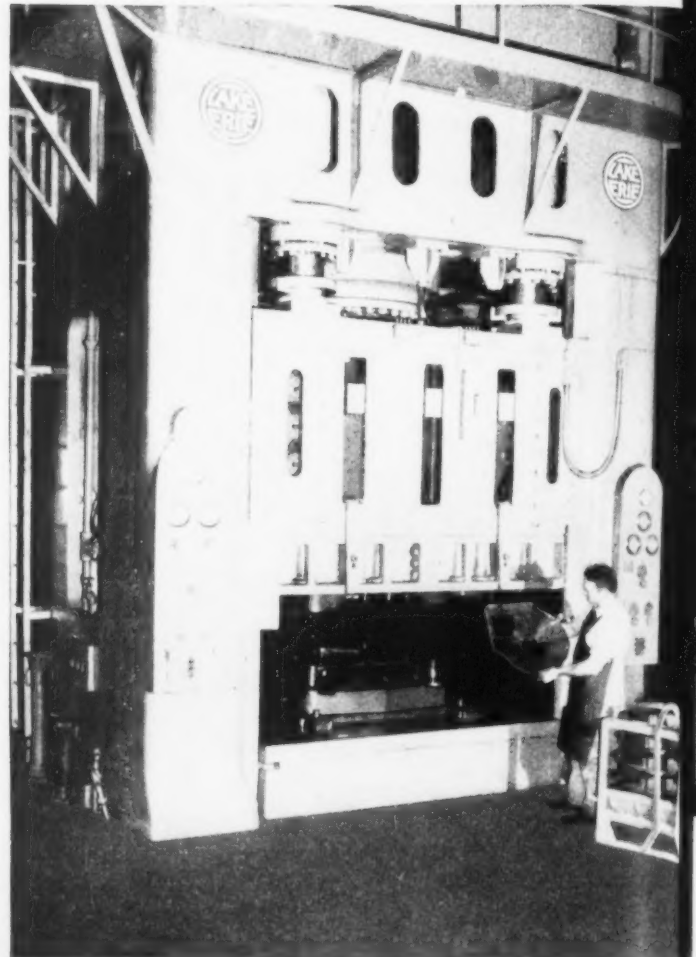
CATERPILLAR TRACTOR CO.

demonstrates the **wide applications** of Lake Erie Hydraulic Presses

A good example of the great variety of money-saving opportunities for hydraulic presses in the modern metal working plant.



TYPICAL PIECES FORMED ON PRESSES. (A) Steel cover 35" long, 26" wide and $\frac{7}{32}$ " thick is blanked and drawn in a single operation with 1200 tons pressure. Cover is pierced, trimmed and restruck on smaller hydraulic press after blanking and drawing. (B) King bolt liners formed out of .134" hard brass are 8" in diameter. Pieces are blanked, drawn and coined on the 500 ton Lake Erie press. (C) Earth-moving bulldozer lifting crank 24"x24"x12" outside, 12"x12"x10" inside x 1" thick blanked in a single operation. (D) Blank for earth-moving bulldozer end plate is 10" wide at one end, 12" at other, 54" long and $\frac{7}{8}$ " thick.

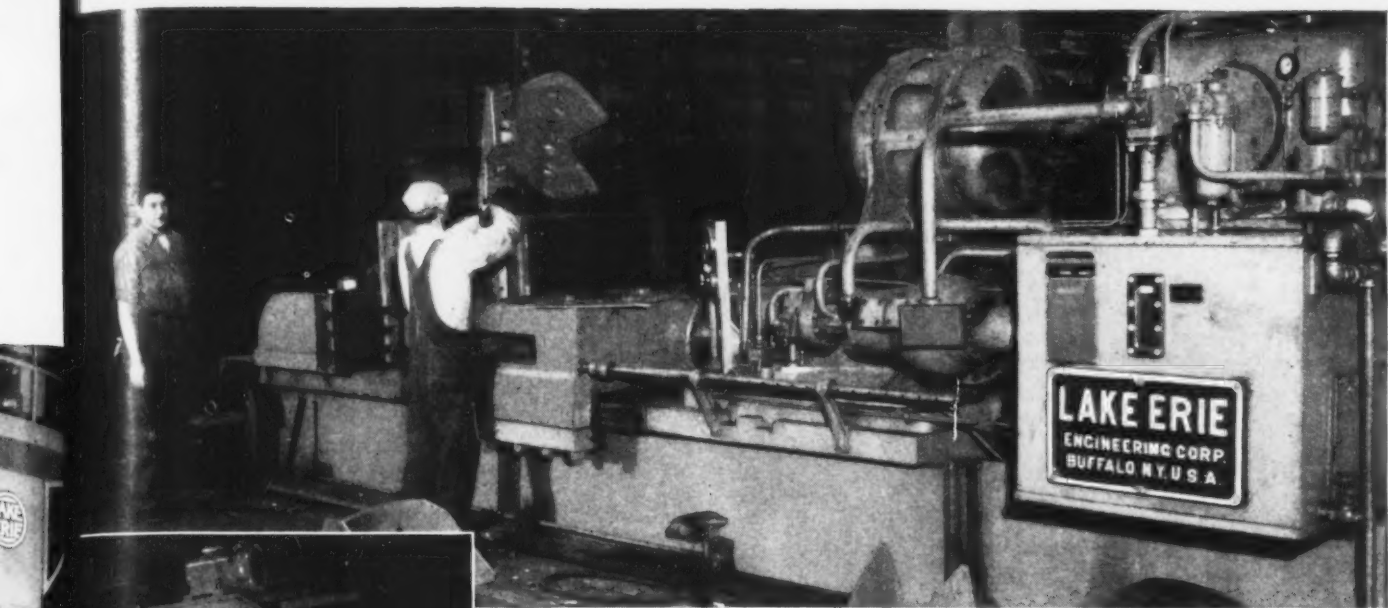


2000 TON DOUBLE ACTION PRESS.

This press has a 500 ton hydro-pneumatic die cushion, bed size of 96"x96" and daylight opening of 60". It is used generally for forming large pieces requiring high tonnage, but is also used for heavy blanking jobs.

750 TON SINGLE ACTION PRESS left — 500 TON DOUBLE ACTION PRESS right.

These presses are used for a wide variety of forming operations including blanking, bending, drawing, piecing and coining. The pieces illustrated at left above are a few examples of the work done on the three presses shown on this page.



500 TON HYDRAULIC BULLDOZER.

This widely-used horizontal press is shown hot forming draft frame reinforcements. Pieces are $\frac{3}{8}$ " thick, 30" wide and approximately 4' long before bending. A pressure of 400 tons is used.

200 TON TRAVELLING HEAD STRAIGHTENING PRESS.

A versatile, highly accurate press that is very much in demand. Used to straighten all types of weldments such as bulldozer blades and other large weldments, some of which appear in lower right corner of photo.



The piece shown above is another example of hydraulic bulldozer work. It illustrates draft frame bottom plates which are hot formed from $\frac{3}{8}$ " thick stock 7 $\frac{1}{2}$ ' long before bending. Draft frame reinforcement also formed on hydraulic bulldozer is shown at left.



THE ABILITY OF LAKE ERIE HYDRAULIC PRESSES to perform a multitude of production jobs that save time and money, simplify design and assembly, and result in a better product for the manufacturer is amply demonstrated at Caterpillar Tractor Co. A carefully selected group of Lake Erie hydraulic presses is busy doing a wide variety of metal forming work. This includes hot and cold bending, drawing, straightening, blanking, piercing, coining, and many other operations, a few of which are illustrated on these pages.

It is hard to conceive of a metalworking plant today that wouldn't benefit immensely through the use of one or more of these hydraulic presses—possibly a hydraulic bulldozer... or a straightening press... or a single action press with die cushion... or some other type or combination of presses. Why not discuss this possibility with our engineers? We have developed more than 3,500 designs for hydraulic presses to meet practically all needs. We serve the leaders throughout industry with complete satisfaction. We can do it for you. Write or phone today.



LAKE ERIE ENGINEERING CORP.

MANUFACTURERS OF
HYDRAULIC PRESSES AND SPECIAL MACHINERY

General Offices and Plant:

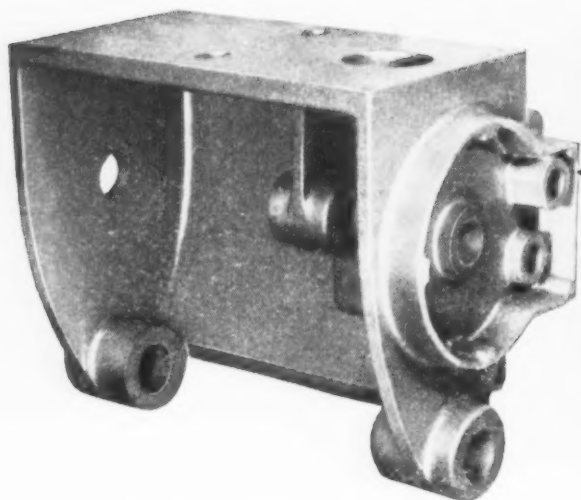
368 Woodward Avenue, Buffalo 17, New York

DISTRICT OFFICES IN NEW YORK, CHICAGO and DETROIT

Representatives in Other Principal Cities in the United States and Foreign Countries
Manufactured in Canada by: Canada Iron Foundries Limited

LAKE ERIE HYDRAULIC PRESSES are available in any size... standard, modified and special designs—horizontal and vertical types—for Metal Working—Plastics Molding—Forging—Metal Extrusion—Processing—Vulcanizing—Laminating—Stereotype Molding—Die Casting—Briquetting—Baling—Special Purpose. LAKE ERIE ®

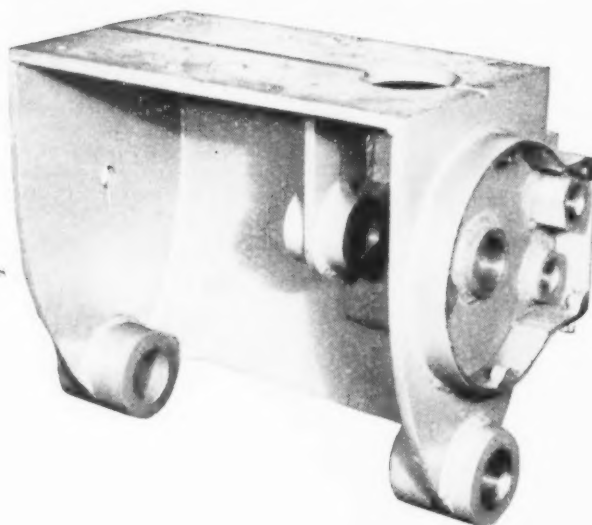
● **Designers and builders of the most complete line of Hydraulic Presses for the manufacturing industries**



Gearbox for power-driven saw, as cast in Gray Iron.

45% SAVED...
on original cost of part

41% SAVED...
on machine and labor expense



Fabricated gearbox, which was replaced by the cast design.

By redesigning in Gray Iron, it is often possible to effect substantial cost savings. Here is a striking example:

The manufacturer of a large power-driven metal saw found that the cost of a fabricated gearbox (right above) was out of line from a competitive standpoint. Designs for a suitable Gray Iron casting were requested and approved. Result:—the Gray Iron casting is effecting a saving of 45% on original cost of the part, plus a saving of 41% on machine and labor expense.

Doesn't this suggest that it's time to analyze *your* costs on certain fabricated parts—with a view to producing them better and more economically in Gray Iron? Write for technical information on the many advantages of the Gray Iron casting process.

GRAY IRON
Characteristics Include:

- Castability
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range

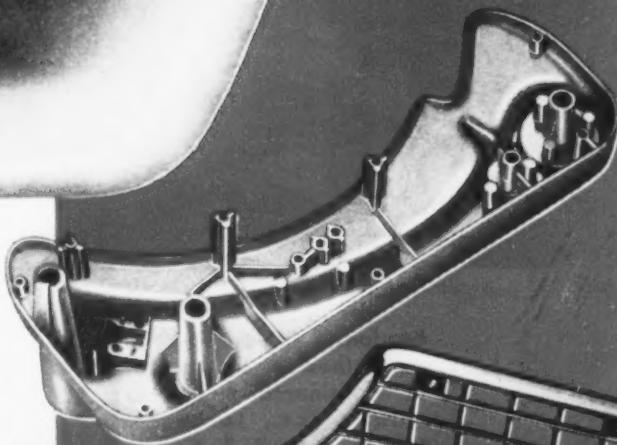
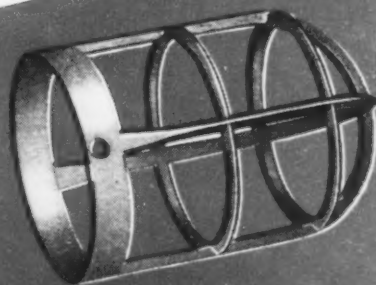
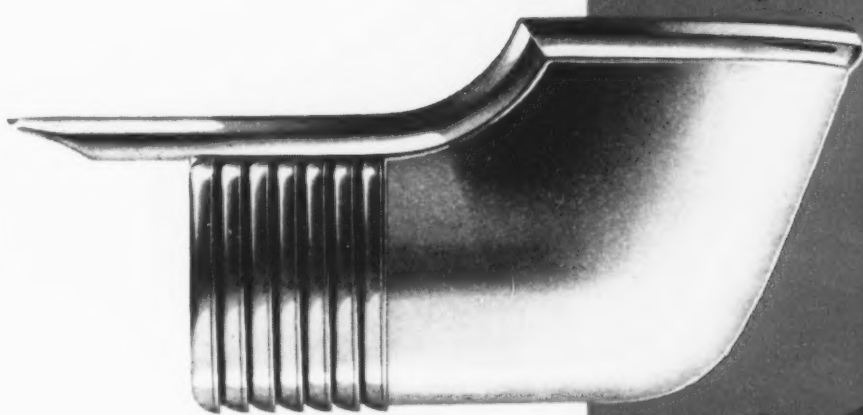


Make it Better with Gray Iron • Second largest industry in the Metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

You're always right with **AUTO-LITE** Die Castings



● Many of America's leading manufacturers, producing a wide variety of products, are benefiting from Auto-Lite die cast research, experience and advancement. Such developments as high pressure casting, special alloying practices and improved quality through the "controlled metals process" make Auto-Lite the logical source of supply for precision die castings. Address inquiries to:

THE ELECTRIC AUTO-LITE COMPANY

Die Casting Division
Woodstock, Illinois

Lockland Division, Cincinnati 15, Ohio

600 So. Michigan Ave.
Chicago 5, Illinois

723 New Center Bldg.
Detroit 2, Michigan

Tune in "Suspense" . . . CBS Radio Mondays . . . CBS Television Tuesdays

DIE CASTINGS • WIRE & CABLE • PLASTICS • INDUSTRIAL THERMOMETERS

DoALL REPORTS...



Bardons & Oliver Turret Lathes in action at Continental Machines, Inc., total twelve. Nos. 2, 3, 5, 7 Ram Type; also 21 B Saddle type turret lathes are all in use at Continental.

BARDONS & O

1136 WEST 9th STREET

...WITH **BARDONS & OLIVER**

Turret Lathes

- ✓ "PRECISION TOLERANCES ON **BOTH** SHORT AND LONG RUNS"
- ✓ "EXTREMELY LOW MAINTENANCE COST"
- ✓ "EFFICIENT SERVICE"



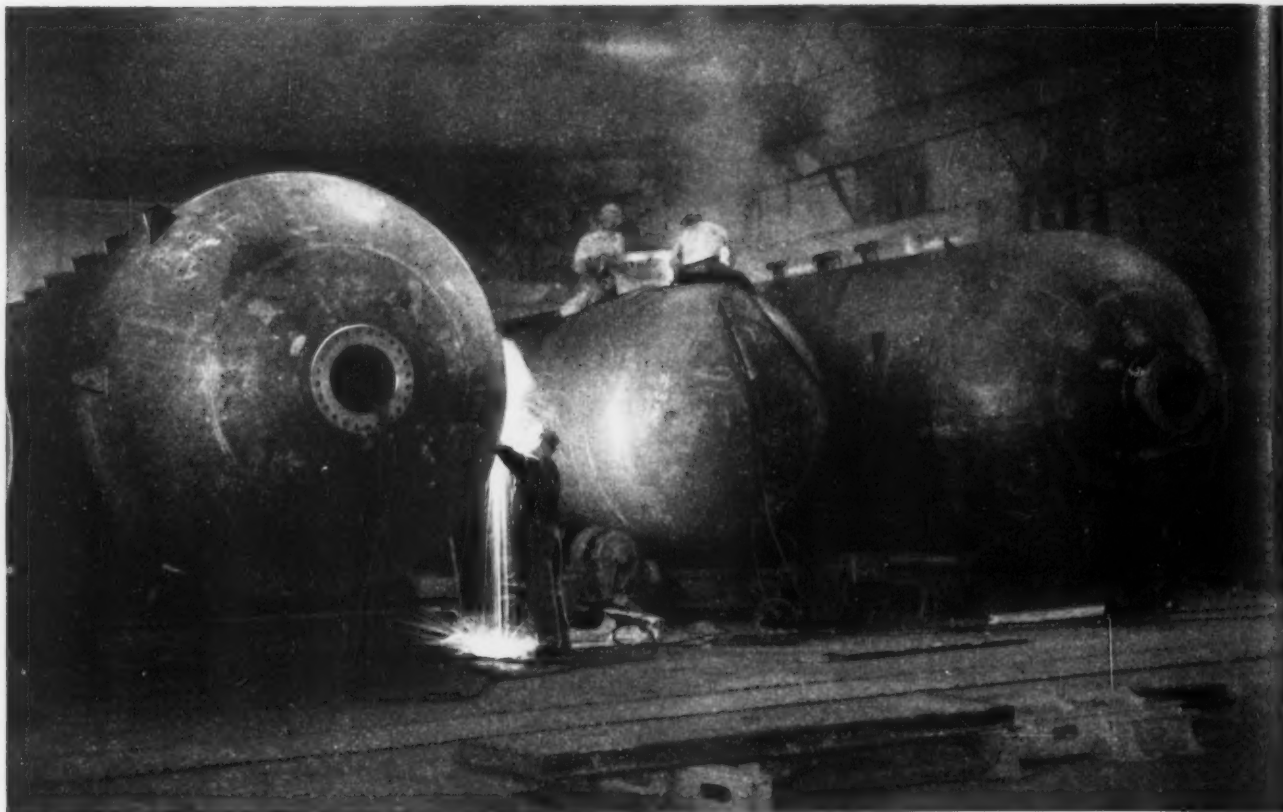
Photo, courtesy Continental Machines, Inc.

& OLIVER, INC.

CLEVELAND 13, OHIO

To quote direct from Mr. J. W. Wilkie, President of Continental Machines, Inc., "*It gives me pleasure to advise you that our Bardons & Oliver equipment has given us most efficient service including extremely low maintenance cost and the ability to produce short and long*

runs within precision tolerances." Continental Machines, Inc., manufacturers of the DoAll precision surface grinders and the complete line of DoAll Band Machines, reports these excellent results with Bardons & Oliver turret lathes. Continental Machines, Inc., have been enthusiastic users of Bardons & Oliver turret lathes for over ten years.



Something Special

IN PRESSURE VESSELS

An excellent example of Graver's skill in fabricating pressure vessels is this 10' x 32' desalting tank for use in a new refinery unit now under construction. The tank was built for an operating pressure of 300 psi.

The steady growth of the petroleum, petro-chemical and chemical industries has greatly increased the demand for specialized equipment, particularly new types of pressure vessels.

Graver's production facilities and skilled craftsmanship have provided the answer to pressure vessel problems for many years. Every Graver-built pressure vessel is fabricated in accordance with the ASME Code for unfired pressure vessels, the API-ASME Code as adapted to the special requirements of the petroleum industry, or to the even more stringent requirements set by customers. Complete X-raying, stress relieving and equipment for rigid inspection are additional features which assure that every fabrication will measure up to the requirements expected of it.

Whether fabricated in steels, clads or alloys, every pressure vessel bearing the Graver nameplate bears the symbol of quality.

GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

NEW YORK • CHICAGO • PHILADELPHIA • DETROIT • WASHINGTON

CINCINNATI • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.



GRAVER

essure
finery
rating

AGE

P



N
O

In
lo
cb
in
w

ir
is
La
in
ri
a

S
T
ri
e
n
r
v
f
p

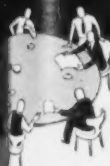
Production Pointers

from

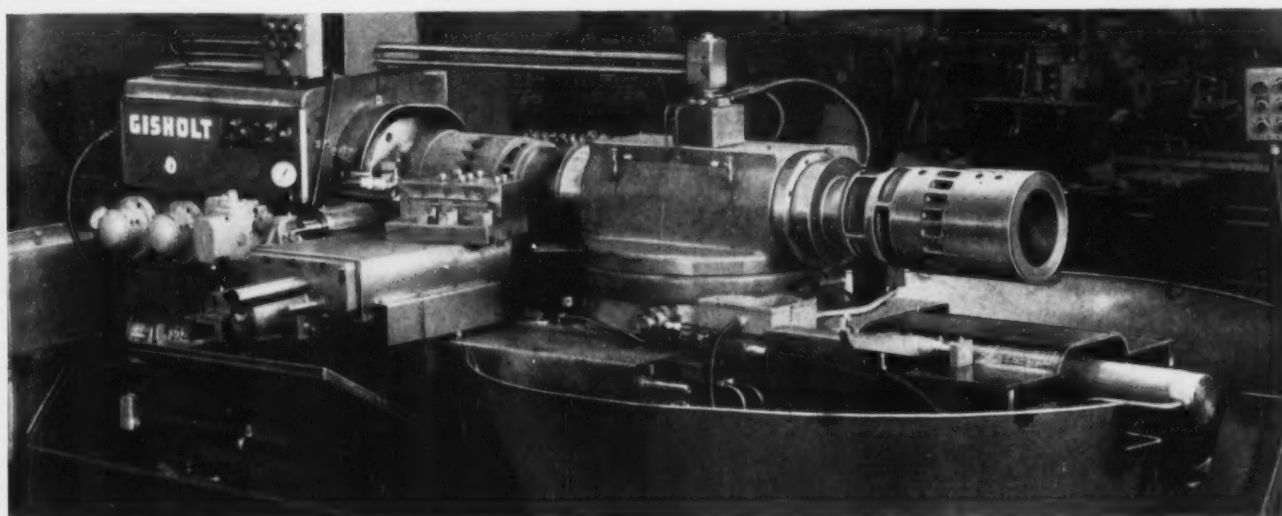
GISHOLT



TIME-
SAVING
IDEAS



Presented as a service to machine shops, we hope some of these interesting ideas, culled from thousands of jobs, will suggest ways to help you cut time and costs in your own metal work.



No. 24 Hydraulic Automatic Lathe with special turret having two mandrels.

PIVOTING MANDRELS END LOADING TIME LOSS

No. 24 Hydraulic Machines One Part While Another Is Loaded

In this interesting production pointer, loading time is actually part of machining time—with one workpiece being put on the lathe or taken off while another is being machined.

The part is a diesel engine cast-iron cylinder liner and the machine is a No. 24 Hydraulic Automatic Lathe which has two identical expanding mandrels on an indexing carriage. Twin arbors are mounted 180° apart with ratchet teeth for driving.

Single Automatic Operation

The automatic cycle begins with carriage moving forward until the arbor engages driving teeth in the spindle nose. This brings in the front and rear slides carrying a total of 28 tools which machine all outside diameters, faces and chamfers. With cuts completed, the tool slides retract, the

work carriage traverses back and automatically indexes the new workpiece into position.

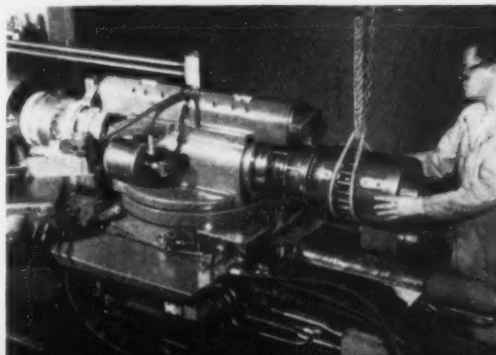
This feature achieves important savings in time and added production. With a finished liner being unloaded and new workpiece put in place during machining, loading and unloading time are absorbed in the machining cycle. Hence, the machine spends most of its time making chips. The only lapsed time between machining is for traversing up, back and for indexing—less than half a minute! Machining time for this liner—and other sizes handled on other No. 24 Hydraulics—is below 3 minutes . . . good reason why this manufacturer standardizes on the efficiency of the No. 24 Hydraulic Automatic Lathe for these operations.

With Twin Mandrels This No. 24 Hydraulic Provides Continuous, Fast Production with No Lost Loading Time.



Machined cylinder liners.

Operator loads new workpiece while another liner is being machined.





TIME-
SAVING
IDEAS

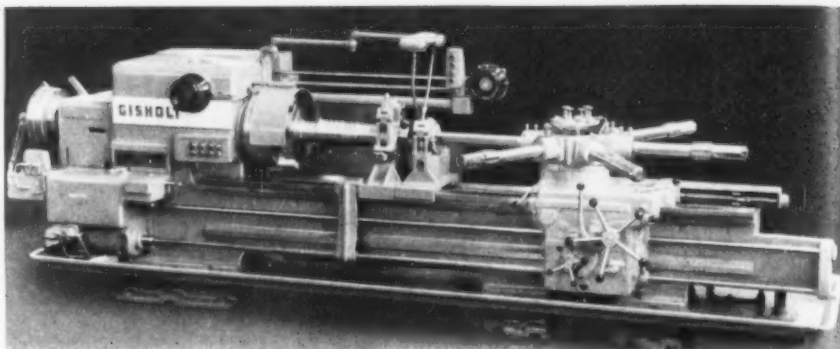
HOW THIS DIFFICULT BORING JOB BECAME AN EASY ONE . . . MORE ACCURATE, TOO

Saddle Type Turret Lathe Is the Answer

Here's the kind of job that qualifies as a tough one, any day. Yet see how this turret lathe takes it in stride. The part is an alloy steel propeller shaft measuring 36½"—with various inside diameters to be machined.

A standard 2L Saddle Type Turret Lathe is "tailored" for the assignment: In place of the side carriage there is a quick-clamping steadyrest and boring support. For safety and convenience, the handwheel for the Hydraulic Speed Selector and the emergency push-buttons are duplicated at the working position.

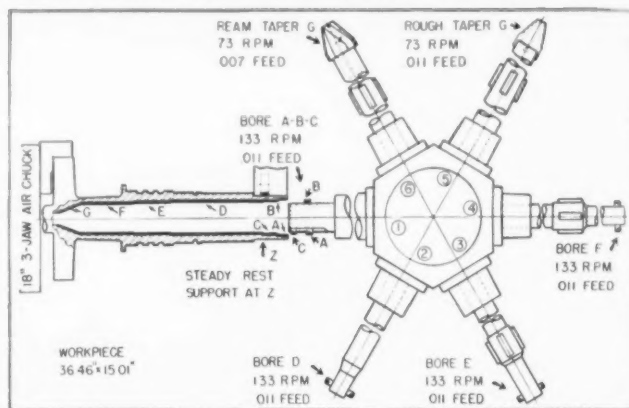
As shown in the layout, seven different internal surfaces are handled. One of these is the taper bore which is rough and finish reamed. Coolant flows through the boring bars directly on the tool bits. Floor-to-floor time with this well planned setup is 30.5 minutes with a high degree of accuracy, proving again that tough jobs can be easy ones on a Gisholt Saddle Type Turret Lathe.



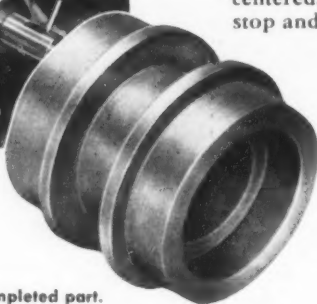
Good setup for deep boring. Note added steadyrest and boring support. Also duplicate controls.

Tooling layout
for boring
propeller shafts.

This Saddle Type Lathe Completes All These Difficult Interior Surfaces in One Chucking.



This close-up shows simultaneous operations on clutch part from both turrets.



Completed part.

"UTILIZING EVERYTHING BUT THE SQUEAL"

Hard Working Ram Type Lathe Setup for Clutch Parts

This job leaves nothing to be desired from the standpoint of efficiency. Everything on the lathe is busy . . . and that's good! The machine is a No. 5 Ram Type with standard hydraulic bar feed and collet chuck and its business is producing 2¼" sliding clutch shifters. Here's how it does it:

1. Stock is moved out to length and centered, using combination stock stop and starting drill.
2. Counter-bore and small bore are drilled from the hexagon turret while both hubs are turned from square turret.
3. Center recess is formed from square turret and the end is then faced from rear tool post.

4. Grinding relief is turned (both sides of center recess) from square turret.
5. Small ID is finish bored and reamed from hexagon turret.
6. Counterbore is finished from hexagon turret and cut off from square turret.

Floor to floor time is 7 minutes—with every minute of the way made easy for the operator by these Gisholt features which provide: 1. Shifts to new spindle speeds by a simple twist of the Hydraulic Speed Selector. 2. Proper spindle speed for reaming the small ID by merely tapping the Hi-Lo lever. And, 3, ease of changing feed by setting a single dial-type lever.

A Splendid Example of Well Planned Tooling and Simultaneous Machining from Both Turrets — Gives Maximum Efficiency to This Ram Type Turret Lathe Job.



LOOK AHEAD . . . KEEP AHEAD . . . WITH GISHOLT

ONE-MAN, TWO-MACHINE TEAM

Gear Blank Savings Are "Automatic"

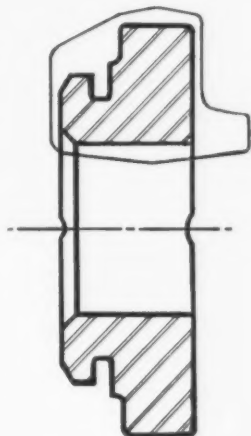
It's a case of perfect teamwork . . . the way these two 2F Fastermatic Automatic Turret Lathes turn out gear blanks. Splitting the job accounts for important savings in time, money.

First machine: With the steel forging held on the chucking hub, three passes are taken through the bore and two passes across the face, then rough turn and chamfer—all handled from the turret. Rough and finish grooving is done by tools on the independent front and rear cross slides. Time: 5 minutes.

Second machine: Part is held in the bore while turret tools remove chucking hub, semi-finish and finish the various diameters and chamfer. The two cross slides complete the rough and finish facing. Time: 3 min.

Not only is gear blank production made fast by this two-machine setup, but it's planned for real economy with one operator tending both lathes. Moreover, with the chance for human error eliminated by the automatic operation of the Fastermatics, there's assured accuracy with true concentrics and parallels.

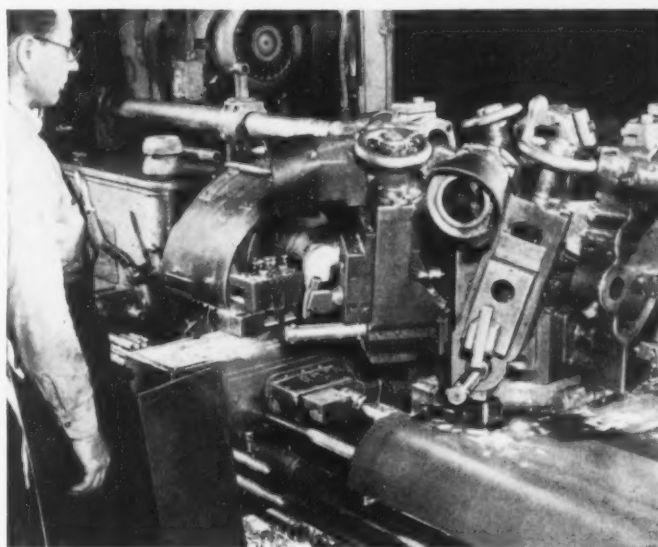
For gear blank work—or any kind that belongs on an automatic turret lathe, investigate the Fastermatic.



Operations required to finish gear blanks. Light line indicates rough forging.



Rough forging and completed blank.



First operations on gear blanks are performed by this Fastermatic.

On This Gear Blank Job, Operator Is Needed Only for Loading and Unloading—the Two Fastermatics Automatically Perform All Work.

PUTS FINISHING TOUCHES TO CRANKSHAFTS — BUT FAST

Simplimatic Does Neat Job on Counterweights

Crankshafts always make interesting machining jobs. On this one, for a V-8 engine, a Simplimatic Automatic Lathe takes care of the six counterweights. Here's the setup:

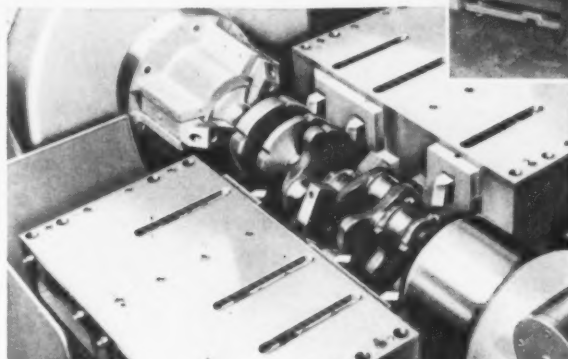
The 25½" crankshaft is held in a special pot-type chuck and driven from a slot in the flange. The oil seal bearing surface rests in a half bearing and is clamped with two jaws. There's a steadyrest at number three main bearing for support. Number one main bearing is held in a tapered, slip-fit bushing in the tailstock.

Three tools each in both the front and rear slides turn all six counterweights and generate chamfers ⅛" by 45 degrees. Floor to floor time is 1.66 minutes, using H. S. S. cutting tools. The sliding tool holders, a precautionary feature for this job, retract into master blocks after cycle is completed, thereby providing loading clearance and tool protection.

All Crankshaft Counterweights Are Turned and Beveled in a Single Automatic Operation by the Simplimatic.

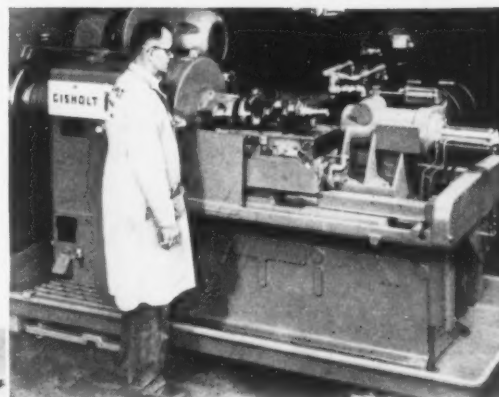
JUST OFF THE PRESS!

An entirely new Simplimatic catalog is ready—complete with the information and specifications you want, pictures and job facts. Write today!



▲ The Simplimatic with part ready for loading. Tool blocks at this point are retracted for clearance and tool protection.

▲ Close-up of the workpiece and tooling. Note steadyrest for center main bearing.





**TIME-
SAVING
IDEAS**



HOW MAINTENANCE BALANCING PAYS FOR ITSELF

Southern Railway Company Adds Life to Diesel-Electric Equipment

Southern Railway Company is doing it, too. In its Pegram Repair Shop, Atlanta, they are getting even greater efficiency and performance from diesel electric locomotives—through balancing. A 6U DYNETRIC Balancer handles balancing in the maintenance of traction motors and generator armatures.

An example is this traction motor armature. Measuring 4 feet long and weighing 2500 lbs., dynamic unbalance is located and measured to an accuracy of 1/4 ounce inch. Corrections are made by welding small steel blocks on the core while the armature is still in the balancing machine. A final check for accuracy and possible operator error is then made.

On this large electrical part, the entire operation—setup, loading, checking, correcting, rechecking and unloading—only requires about one hour. Yet, this accuracy of balance—with smoother, vibrationless operation and lessened bearing wear—pays off in far longer life between overhauls, returning balancing costs many times over.

If maintenance of electrical equip-

ALL MATTERS OF BALANCING, maintenance and production balancing are covered fully in the *Gisholt Balancing School*. Write for details, starting dates.



Ready to check and correct unbalance in 2500 lb. armature.

ment is a problem of yours, ask for the article on balancing applications in railway shops. With it we will include the book *Static and Dynamic Balance*, which thoroughly covers the entire field of balancing.

Precision Balancing of Railway Electrical Equipment Greatly Reduces Frequency of Failure and Assures More Efficient Operation.

**DYNETRIC
BALANCERS**



DEVELOPED JOINTLY WITH
WELLSBOROUGH ELECTRIC CORPORATION
DYNETRIC IS A TRADE MARK
REG. U. S. PAT. OFFICE BY
WELLSBOROUGH ELECTRIC CORPORATION



Dial indicates exact number of correction units required.

THE WAY TO BETTER CRANKSHAFTS—SUPERFINISH

Versatile Machine Handles Variety of Sizes

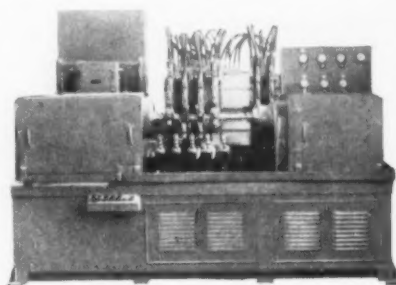
Even on diesel engine crankshafts, Superfinishing is a quick, inexpensive process.

This Superfinisher is a Model 77, arranged to do both pin and main bearings on a variety of 4 and 6 throw crankshafts. Four sets of stones in each of the upper stoneholder assemblies handle the pin bearings. Lower assemblies each have two sets of stones for the main bearings.

Crankshafts come to the Superfinisher with rough ground bearing surfaces of 20-30 micro inches. After a 2-3 minute automatic cycle, surfaces measure 4-5 micro inches. What this finer smoothness means in greater crankshaft performance is obvious—

grinding chatter marks and smear metal are removed, there's improved geometry, added smoothness and longer bearing life.

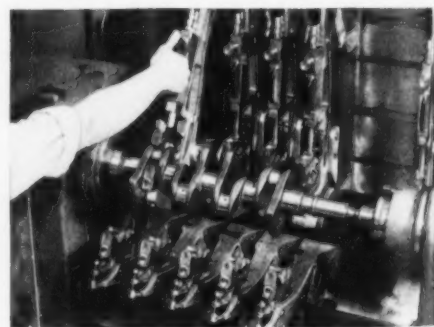
See how your own problems can be solved by Superfinishing. Write for your complimentary copy of



Model 77 Superfinisher for 4 and 6 throw crankshafts.

"Wear and Surface Finish."

Superfinishing These Crankshaft Bearings Not Only Assures Longer Lasting Surfaces, but It Also Cuts Grinding Time and Costs.



Close-up showing upper and lower stoneholder assemblies for Superfinishing pin and main bearing simultaneously.

No. 9-1052

599



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

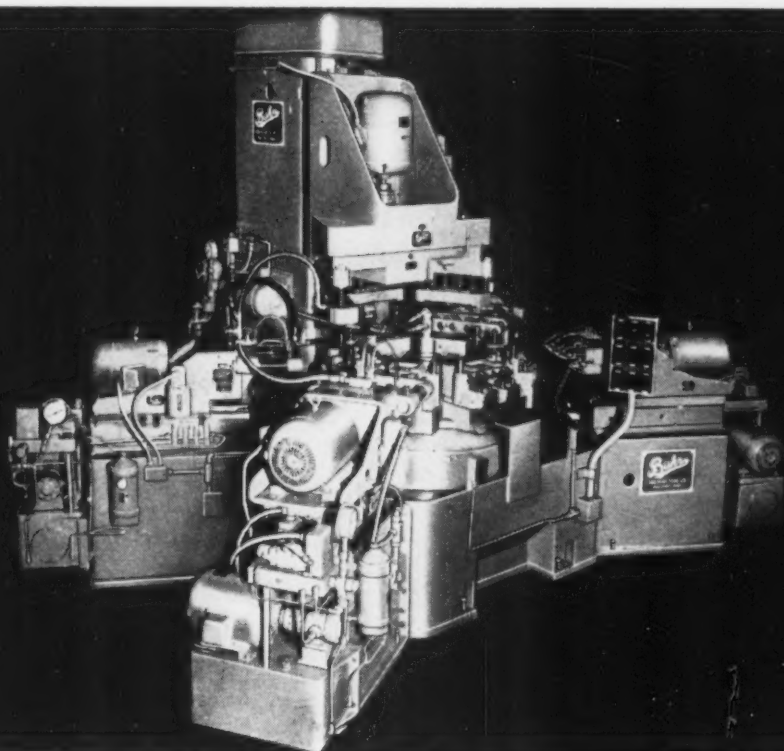
GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

WHY DOAKES GETS FROM BANFF TO TALLAHASSEE



What are the travel and automobile agencies reporting every season? . . . That Joe Doakes—the typical American—is taking more vacation and traveling farther year after year . . . And here's one of the reasons why—this Buhr Five-Way Horizontal-and-Vertical Hydraulic-Feed Drilling

Machine . . . the Machine which one of the world's leading Auto Makers uses "around the clock" for producing Rocker Arms in such volume and at such low cost that . . . Joe Doakes may afford to drive thousands of miles for vacations—literally from Banff in west Canada to Tallahassee, Fla.

Auto Maker Chooses This to Turn Out 880 Pieces an Hour for Utmost Economy

As each new model comes off the auto assembly lines, the battle to cut production costs becomes more intense. Not long ago, one of the big auto companies concentrated on how to make a certain rocker arm most economically.

Here Was Their Problem

To secure a piece of production equipment which would perform 7 operations on the rocker arm, including tapping, drilling, endmilling, chamfering and spotfacing—that was the problem.



As the company to design and manufacture the Special Machinery to solve this problem, they chose Buhr.

What the Machine Does

In general—it drills 8 holes, drills through 4 more holes, taps 4 holes, endmills 4 places, spotfaces 4 places and chamfers 4 previously drilled holes. It is equipped with 42" automatic Index Table and six-

station Holding Fixture, loading four parts per station. Parts are automatically clamped while fixture moves from loading position into first working station, and are automatically unclamped while Fixture moves from last working station to unloading.

Specifically, the Machine does this—

Station 1—Load and Unload

Station 2—Vertical, idles; Horizontal, taps and drills (4) $\frac{7}{16}$ "-20 holes

Station 3—Vertical, endmills (4) $\frac{1}{2}$ " Radius places; Horizontal, chamfers (4) previously drilled holes

Station 4—Vertical, drills (4) $\frac{1}{8}$ " dia. holes $\frac{3}{16}$ " deep; Horizontal, idles

Station 5—Vertical, drills (4) $\frac{3}{32}$ " dia. holes through; Horizontal, spotfaces (4) $\frac{15}{16}$ " dia. places

Station 6—Vertical, idles; Horizontal, taps (4) $\frac{7}{16}$ "-20" S.A.E. holes

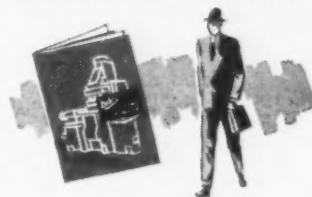
PRODUCTION—880 pieces per hour at 100% efficiency.

Why Buhr Was Called In

Leading Automobile Manufacturers have done business with Buhr for more than a quarter-century. . . . They know Buhr's record for dependable Special Machinery

. . . and for delivering on time. . . . They're familiar also with Buhr's excellent manufacturing facilities . . . and their experienced, trustworthy and specialized sales and engineering staffs. Consequently . . . for Special Machinery like this . . . it is second-nature for them to call Buhr.

For Details About Buhr



A comprehensive Catalog . . . or a personal call from a Buhr Sales Engineer . . . is yours for the asking wherever you are located in the United States! . . . For every problem involving this type of Special Machinery—including the type which helps Joe Doakes get from Banff to Tallahassee—phone, wire or write us.

BUHR MACHINE TOOL CO.

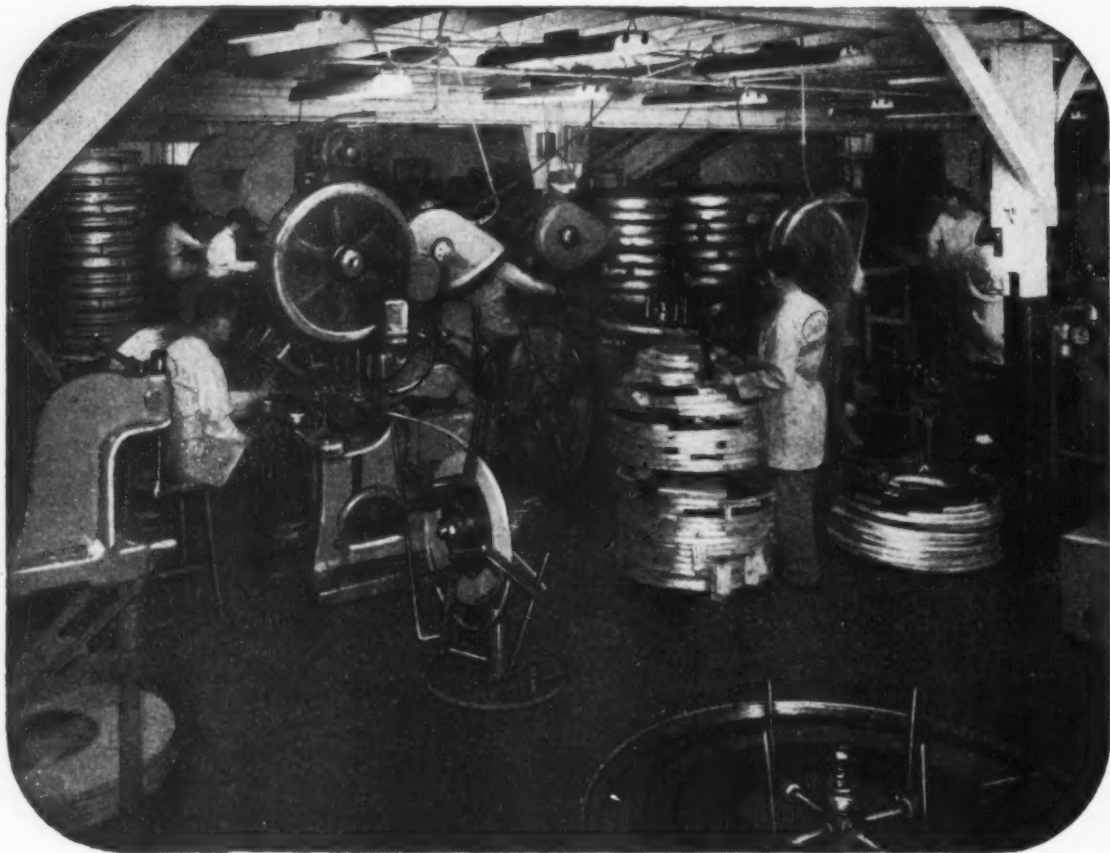
Ann Arbor, Michigan

Phone: Ann Arbor 2-5646—5980
Detroit WOODWARD 3-2126

Buhr

SPECIAL MACHINERY . . . Leaders Make Sure with BUHR

FLAT SPRING STEEL



***You can get it now! . . . and we believe it's
the best spring steel we've ever made***

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine

stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 BLEEPER ST •
CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253
FREDONIA AVE • CLEVELAND, 13225 LAKEWOOD
HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. •
DETROIT, 915 FISHER BLDG • HOUSTON, 6216
NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR
ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS,
1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST •
SAN FRANCISCO, 1740 17TH ST • SEATTLE,
900 1ST AVE S. • TULSA, 321 N.
CHEYENNE ST • EXPORT SALES
OFFICE, TRENTON 2, N. J.



PRODUCING AGAIN...

13 HOURS SAVED

*Powder-lancing pierces
blast-furnace salamander in only ½ hour*



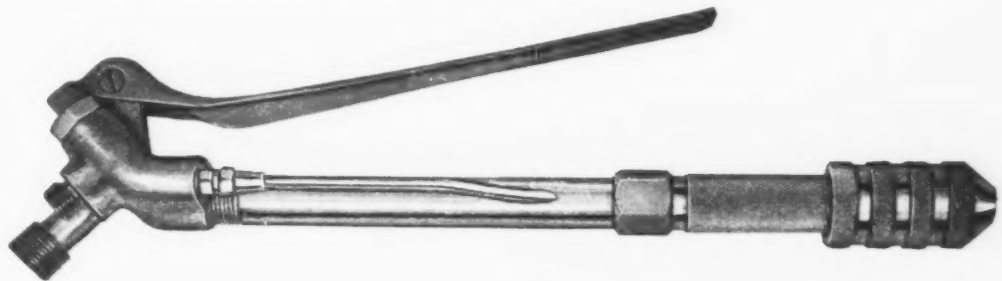
That's just one case. Other steel mills have gone back into production just as quickly—thanks to the efficient use of powder-lancing.

Powder-lancing is a new idea for increasing the efficiency of oxygen lance operations. By introducing powder into the oxygen stream, an exothermic reaction results producing extremely high temperatures. Holes are easily pierced not only in salamanders, but in concrete, cinder block, fire brick, aluminum, and other materials at

speeds up to 11 in. per minute. And lance pipe needs no threading. A twist seals it into the holder.

LINDE'S ACL-1 Powder Lance automatically adds to the oxygen stream the correct amount of powder for best results. For further details, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Dominion Oxygen Company, Limited, Toronto.

LINDE'S ACL-1 Powder Lance can be used with any standard pipe.



LOOK TO

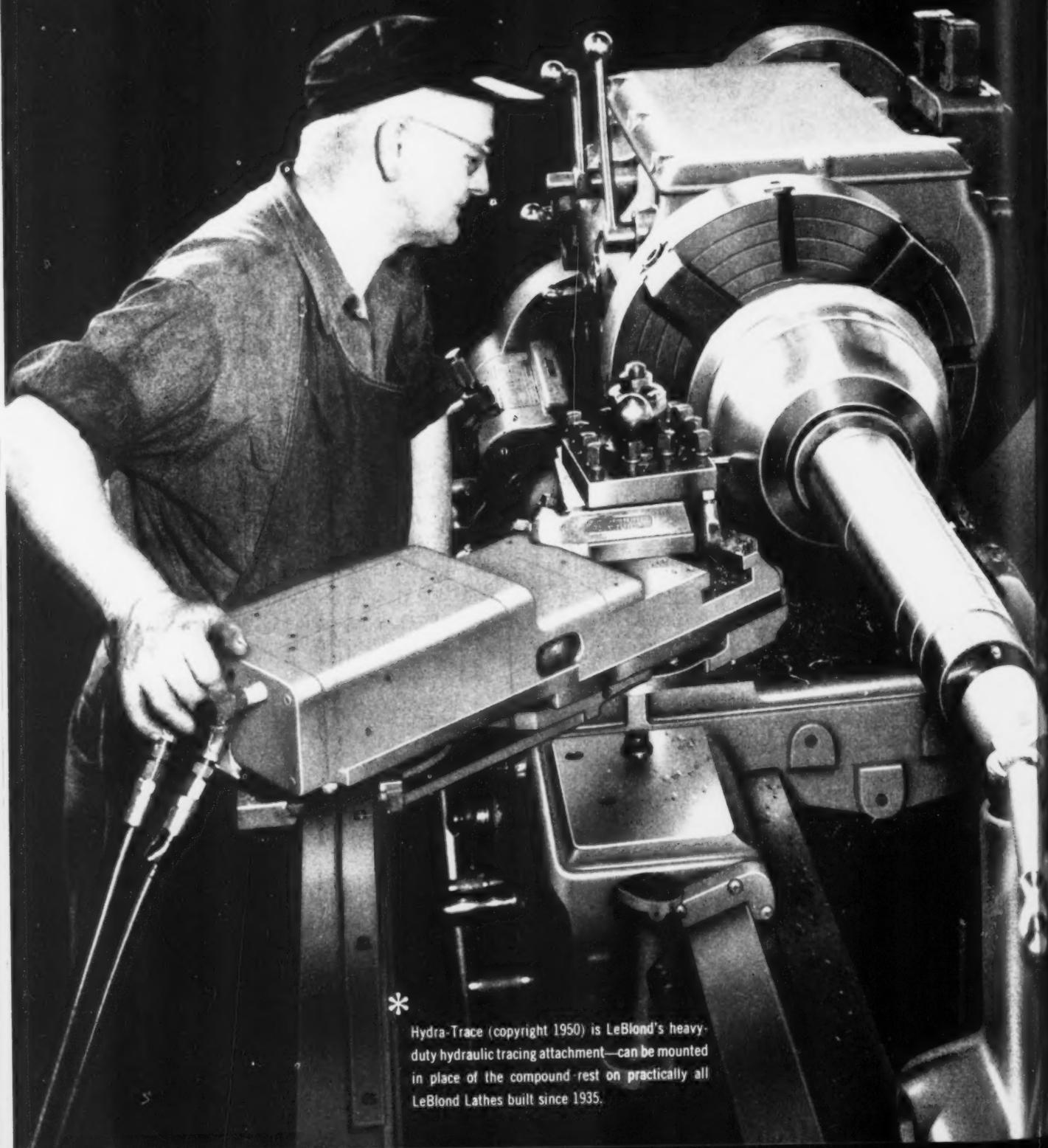
Linde
Trade-Mark

know-how . . . show-how . . . products and processes
FOR WELDING, CUTTING, TREATING, FORMING METALS

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

October 9, 1952

"sweet is the name for HYDRA-TRACE" *



*

Hydra-Trace (copyright 1950) is LeBlond's heavy-duty hydraulic tracing attachment—can be mounted in place of the compound rest on practically all LeBlond Lathes built since 1935.

*
E"

SC



THE

Ask for
for com
LeBlon

WOR

says sugar centrifugal manufacturer

turning time cut 60%
on contoured 3-step shaft

Centrifugal machines made by The Western States Machine Co. of Hamilton, Ohio are used in all corners of the world for the processing of sugar. Three years ago, this company had to speed up machining methods.

One important part, a contoured 3-step shaft—called a "ball and quill"—carries the thrust of the basket as it spins at 1800 rpm. The ball allows the basket to shift slightly, compensating for unbalanced loads. This part was first produced in the usual manner, which included turning the contour with a radius attachment, followed by tedious file finishing.

Then, on the recommendation of LeBlond's Cincinnati Distributor, E. A. Kinsey Co., a Hydra-Trace unit was installed on a 16" LeBlond Heavy Duty Lathe. The result was "sweet"—turning time cut 60%!

Sweet, too, were the other benefits of Hydra-Trace. No need for highly-skilled operators. Flat templates, made quickly, stored easily. Short set-up time. Heavy-duty capacity. Many more.

See how you can reduce to hours and minutes tracing jobs formerly measured in weeks and days. Ask your distributor or write us direct for the rest of the story on Hydra-Trace.

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for bulletin HT2C
for complete details on
LeBlond Hydra-Trace

turned faster by



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 64 YEARS



55 PAGES OF FACTS ON HOW TO CUT YOUR SMALL PARTS FINISHING COSTS

Now you can get up-to-the-minute news on the very latest developments in barrel-finishing — the fast, modern, economical process that deburrs, removes scale, tool marks and flash, and produces surface finishes and radii to blueprint specifications.

Norton Company's brand new booklet covers the subject thoroughly in 55 liberally illustrated, fact-filled pages — describes in detail every phase of barrel-finishing — tells you what to do, and *what not to do*, for best results.

PARTIAL LIST OF SUBJECTS

TYPES OF EQUIPMENT . . . CLEANERS . . . ROUGHING . . .
RUST PREVENTIVES . . . FINISHING . . . PROCESSING OF
SAMPLES . . . SEPARATION OF WORK FROM ABRASIVE . . .
WASHING . . . DRYING . . . RESCREENING OF ABRASIVE . . .
MIXING DIFFERENT PARTS.

GET THIS MONEY-SAVING INFORMATION

The new booklet also tells you how Norton ALUNDUM* tumbling abrasive — especially developed to meet industry's wartime needs for fast, efficient small parts finishing — has become a standard barrel-

finishing medium in plants throughout the country.

Learn how this tough, hard abrasive helps you to shorten tumbling cycles, reduce scrap and reworking, and gives you consistently better finishing of parts ranging in size from tiny rivets to larger castings. Ask your Norton distributor or representative for your free copy of "Barrel-Finishing With ALUNDUM Tumbling Abrasive," or write us direct.

NORTON COMPANY, WORCESTER 6, MASS.

Distributors In All Principal Cities

EXPORT: NORTON BEHR-MANNING OVERSEAS INC.
Worcester, Mass. New Rochelle, N. Y.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON

ABRASIVES

*Making better products to make
other products better*



How to make aluminum look like satin

Pennsalt AE-18 gives beautiful etch with fewer maintenance man-hours

When the makers of a well known line of refrigerators switched from stainless to aluminum refrigerator evaporators, they installed a brand new layout in the finishing department. The evaporators came down a continuous line to be cleaned of stamping oil and brazing flux, then etched, followed by anodizing. The etch, of course, was the critical step.

The representative from Pennsalt's Metal Processing Service recommended a five-step cycle, as follows:

1. Clean with Pennsalt Cleaner MC-1
2. Hot rinse
3. Etch with Pennsalt AE-18
4. Rinse
5. Anodize

Result: Pennsalt AE-18 produced that rich satin finish so necessary in the refrigerator industry. In fact, the finish is so uniformly good that the superintendent, the process engineer and the development engineer are planning to discontinue painting with aluminum paint.

Cuts Tank Cleaning Time

Just as important to cost-conscious production men is AE-18's economy. The *original* non-scaling etchant, AE-18 doesn't form a rock-like deposit in the etch tank—can be flushed out with a hose in minutes. Compare this with the former method of laborious hand-chipping of granite-like scale, and you have savings of up to 36 man-hours *every week* on tank cleaning! The men on the tank, too, like Pennsalt AE-18 because of the reduced fuming and easier solution control.

Your Pennsalt Metal Processing Service representative is thoroughly trained and experienced in the problems of aluminum etching, as well as other finishing problems. Discuss your needs with him, or write: **Pennsalt Metal Processing Service**, 1000A Widener Bldg., Philadelphia 7, Pa.

Cold-working Steel ?

Investigate Pennsalt's new Fos Process, an integrated method for protecting steel and dies during extreme cold working. Ask your Pennsalt man, or outline your problem in a letter.



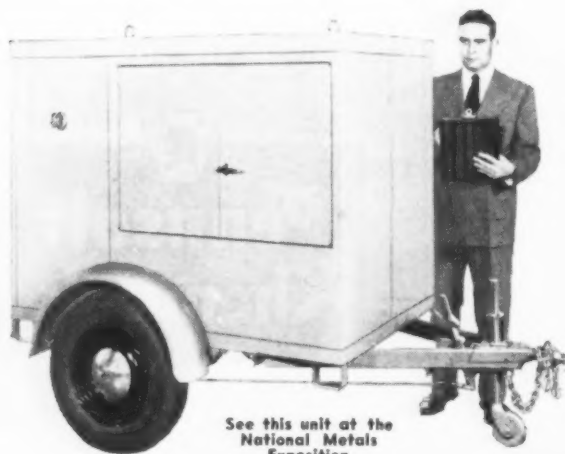
Pennsalt Chemicals

A BETTER START FOR YOUR FINISH

NOW — a *truly* portable industrial x-ray unit! The General Electric RESOTRON 250



*Compact, lightweight,
250,000-volt x-ray unit speeds
inspection of large structures,
saves many hours of set-up time*



See this unit at the
National Metals
Exposition

For radiographic examination of welds or castings in large structures, the new GE Resotron 250 offers unprecedented advantages. Completely housed in a cabinet only 4 x 6 x 4-foot high, which may be trailer-mounted, this unit can be set up anywhere in a few minutes by one or two men.

Small, lightweight tube head can be passed through a 15-inch diameter opening for interior inspection of large vessels. It's particularly adapted for ship hulls, pressure vessels, steam pipes. No cranes or elaborate rigging needed — can be manipulated manually.

Resotron 250 is the latest addition to the complete GE line of industrial x-ray apparatus . . . ranging up to 2,000,000-volt units and betatrons. It is actually a miniature of the famous General Electric million-volt Resotrons, with such time-proven features as resonant transformer, cascade tube and gas insulation.

Have you inspection problems the Resotron 250 might solve? See your local GE x-ray representative. Or write X-Ray Department, General Electric Company, Milwaukee 1, Wis., Rm. AR-10.

GENERAL  ELECTRIC



W. FISHER

WHENEVER you need
SPECIAL STEELS
for special purposes
check first with
Ingersoll

- carbon electric steel for tank clutch discs • alloy steels • armor plate • clutch plate steels • tillage steels • soft center steel • shovel steels • knife steels • saw steels, including high speed hack saw blade steels • Tem-Cross steel • heat-resisting steels • stainless steels • IngAclad stainless-clad steel



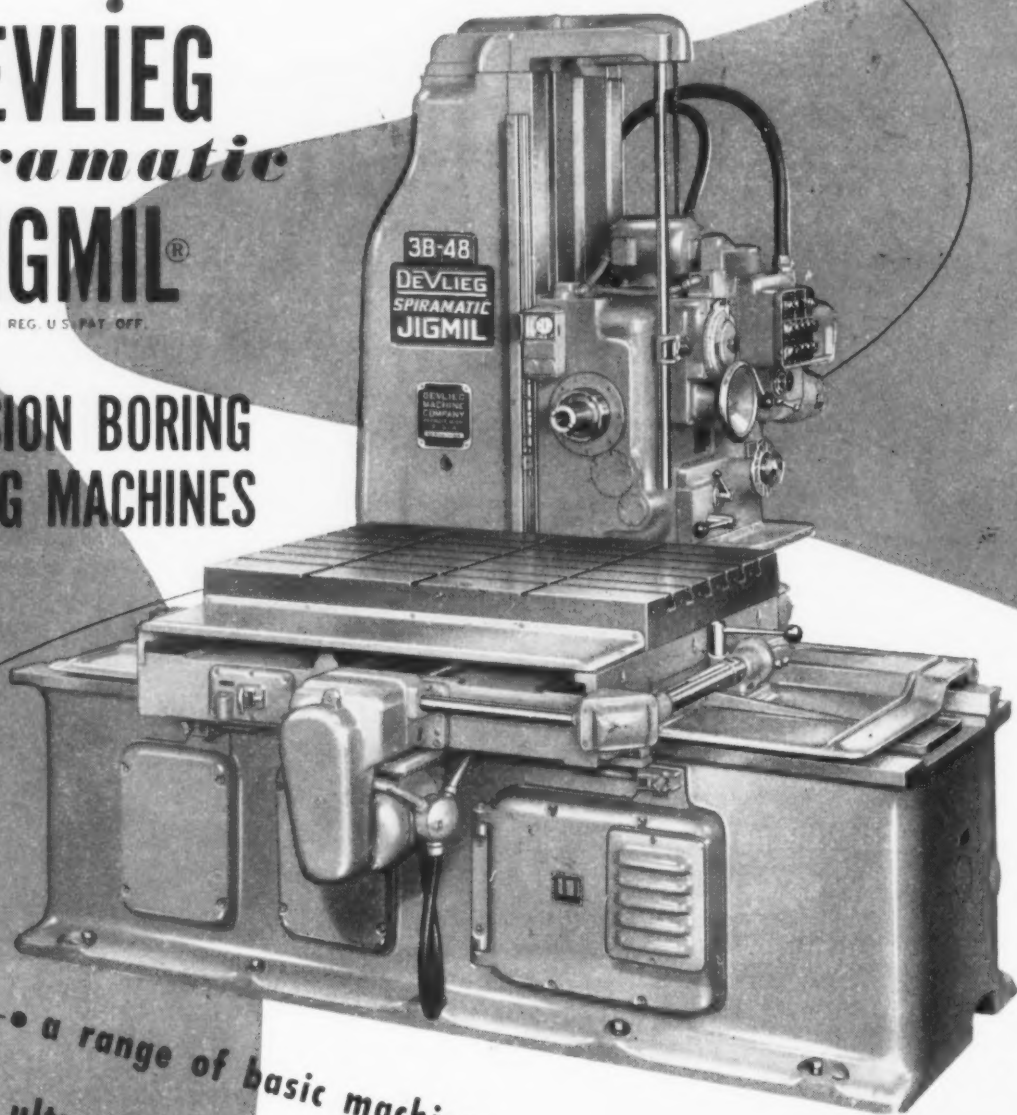
Ingersoll STEEL DIVISION

Berg-Warner Corporation • NEW CASTLE, INDIANA

DEVLIEG *Spiramatic* JIGMIL®

(R) REG. U.S. PAT. OFF.

**PRECISION BORING
and MILLING MACHINES**

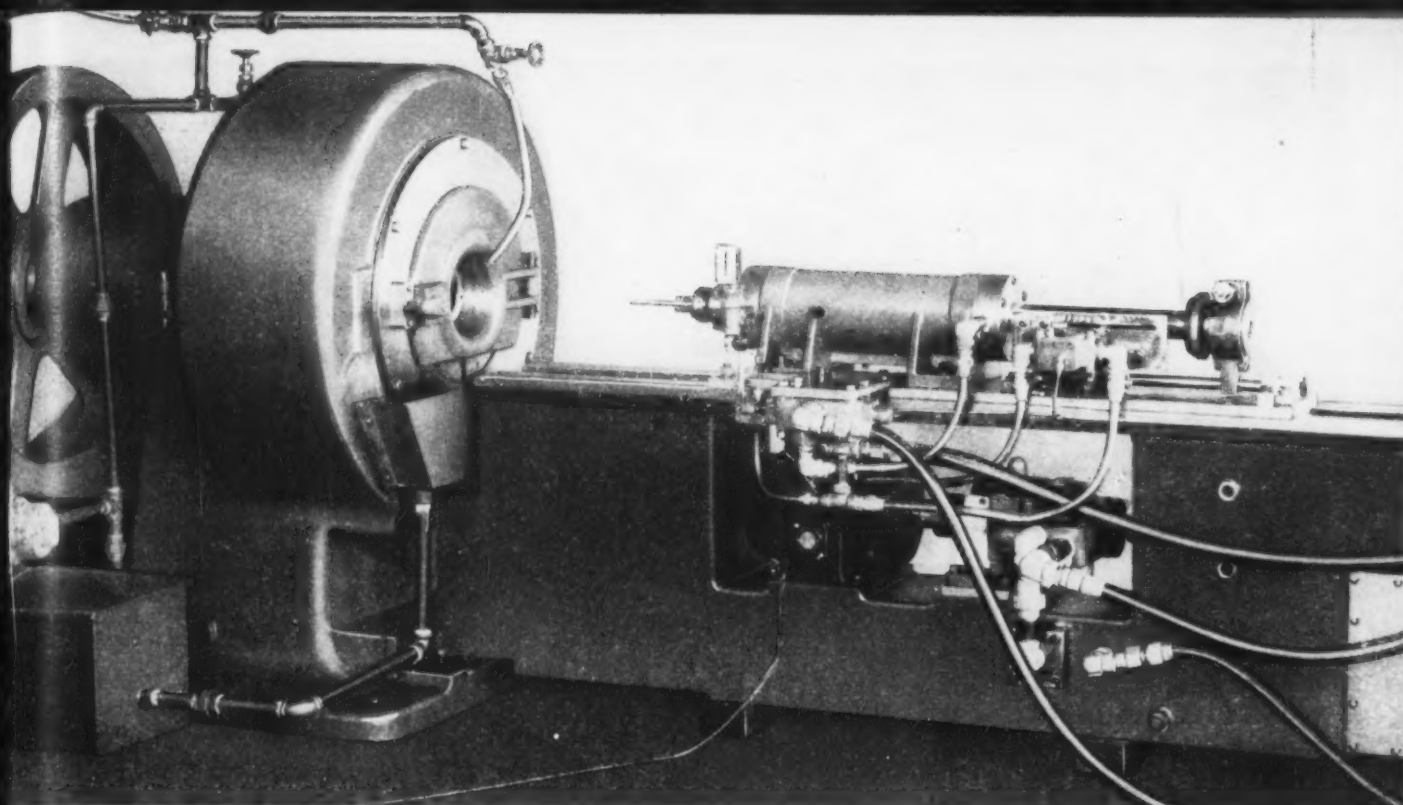


• a range of basic machines
for ultra precision boring and milling

for the latest
developments in
precision boring
equipment . . . consult—

DEVLIEG OF DETROIT

DEVLIEG MACHINE COMPANY • 450 FAIR AVE., FERNDALE, DETROIT 20, MICH.



FENN SWAGING MACHINE, featuring hydraulic feed, automatic chucking, and oil-cooled dies, is fast replacing

lathes and screw machines for shaping a wide range of metal parts because it . . .

MAKES METAL GO TWICE AS FAR

Yes, you can cut your metal requirements in half, in many cases, with this Fenn Swaging Machine. That's because it doubles the length of the blanks it shapes . . . with absolutely no stock removal.

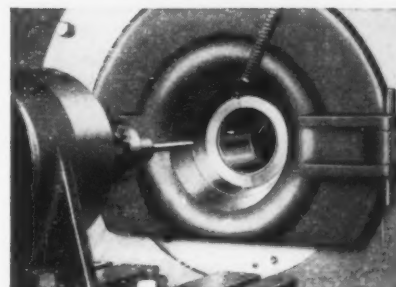
MANY OTHER ADVANTAGES

What's more, this Fenn Swager produces a denser structure in metal parts . . . maintains concentricity . . . gives an improved finish . . . requiring no subsequent grinding . . . calls for less operator

skill than any other machine capable of producing equivalent parts.

WRITE FOR SPECIFICATIONS

It will pay you to investigate all the cost-cutting, material-saving advantages of the Fenn Swager. Contact the Fenn distributor nearest you for facts and delivery schedules, or write direct to THE FENN MANUFACTURING COMPANY, 1845 Broad St., Hartford 1, Conn.



SIMPLE DIE CHANGES, using blanks in various diameters, make Fenn Swaging Machines quickly and easily adaptable to a wide variety of jobs. You can use them for reducing, pointing, or forming bar stock or tubing. Also for assembling fittings to cables. Fenn Swagers and Hydro-Formers come in sizes and designs for every swaging need.

FENN

Shaping metal for better and stronger products at lower cost

FENN MACHINES ARE SOLD BY:

ATLANTA

J. R. Walraven

BALTIMORE

Refers: Calco Mach'y Co., Phila.

BIRMINGHAM

Quinn & Quinn

BOSTON

Refers: C. Toolin, Providence

BUFFALO

Syracuse Supply Co.

CHICAGO

Neff Kohlbusch & Bissell, Inc.

CINCINNATI

The Seifert-Elstad Machinery Co.

CLEVELAND

Wm. K. Stamefs Co.

COLUMBUS

The Seifert-Elstad Machinery Co.

DALLAS

C. J. Harter, Machinery

DAYTON

The Seifert-Elstad Machinery Co.

DETROIT

The Chas. A. Strelinger Co.

GRAND RAPIDS

Joseph Monahan

HOUSTON

C. J. Harter, Machinery

INDIANAPOLIS

State Machinery Co.

KANSAS CITY, MO.

Robt. R. Stephens Machinery Co.

LOS ANGELES

Hoffman & Heartt

MILWAUKEE

Neff Kohlbusch & Bissell, Inc.

MINNEAPOLIS

Northern Machinery & Supply Co.

NEW ORLEANS

Staats & Haas, Inc.

NEWARK

A. C. Cook

NEW YORK

The Silvers Machinery Co.

NORFOLK

Tidewater Supply Co. Inc.

PHILADELPHIA

Calco Machinery Co.

PHOENIX

Hoffman & Heartt

PITTSBURGH

Wm. K. Stamefs Co.

PROVIDENCE

Charles Toolin

ROCHESTER

Syracuse Supply Co.

SAN FRANCISCO

C. F. Bulotti Machinery Co.

ST. LOUIS

Robt. R. Stephens Machinery Co.

SEATTLE

Star Machinery Co.

SYRACUSE

Syracuse Supply Co.

CANADA

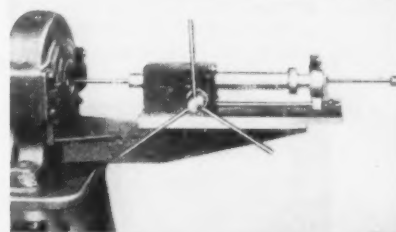
MONTREAL, QUEBEC

TORONTO, WINDSOR

Williams & Wilson Ltd

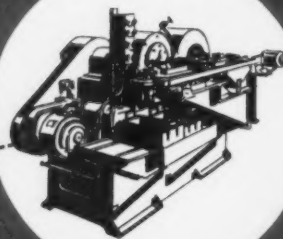
FOR EXPORT:

Indianapolis Machinery Export Co., Inc., New York, N. Y.

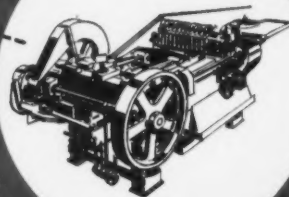


FENN FEEDING DEVICES, either manually or hydraulically operated, are available for all sizes of swagers. They speed up production and reduce operator fatigue.

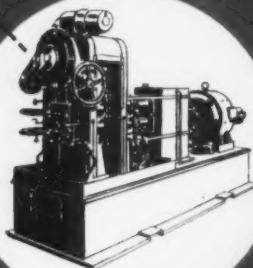
5 KINDS OF WATERBURY FARREL ANSWERS TO YOUR MASS PRODUCTION PROBLEMS



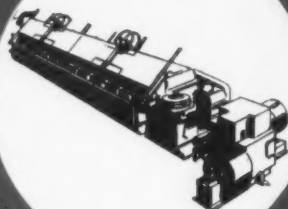
COLD PROCESS BOLT & NUT MACHINERY — Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.



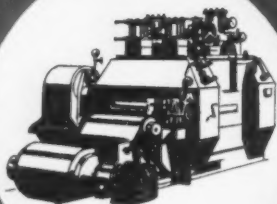
POWER PRESSES — Crank, Cam and Toggle, also Rock and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.



MILL MACHINERY — Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc.



WIRE MILL EQUIPMENT — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Painters • Swagers • Bull Blocks • String-up Machines • Spoolers, etc.



SPECIAL MACHINERY — Synchronic Mills • Small Arm Ammunition Machines • Collapsible Tube Machines • Coining Mills, etc.



HERE'S A SAMPLE of Waterbury-Farrel mass production equipment in action. This complete WF automatic production unit combines a 40-ton double-acting, upright blanking and cupping press, a conveyor feed and four 7-station horizontal drawing presses to draw 340 zinc shells per minute.

Within These Basic WF Equipment Lines, Individual Machines Are Custom-Engineered For Specific Applications

If your metal-working machinery problem falls into any of these five groups, there are good reasons for looking to Waterbury Farrel for the answer.

There's Waterbury Farrel's continuing engineering research with more than a century of machine building experience to draw upon. This results in soundly designed and thoroughly tested features which improve production.

There's Waterbury Farrel's world-wide reputation for rugged, long-lasting construction. This gives you the assurance that WF machines are built to provide long years of uninterrupted production.

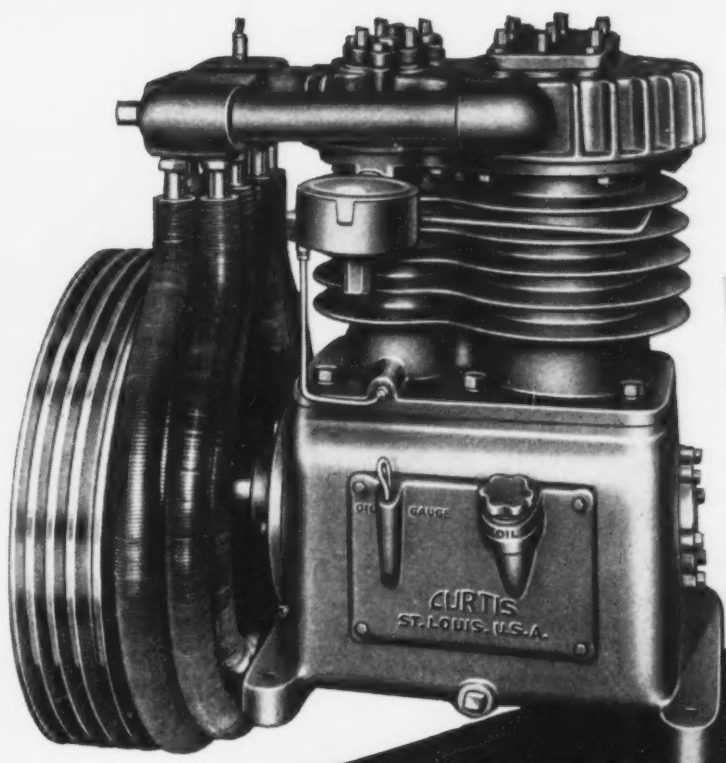
Waterbury Farrel can custom-engineer special equipment or adapt a standard machine to fit your specific problem.

For further information, write for free booklets on any of the machines mentioned on this page or contact your nearest WF office.



WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.



It's new Curtis

MODEL 98 AIR COMPRESSOR
Two Stage Air Cooled 15 and 20 Horse Power

designed to give you **even greater dependability
lower cost operation
longer life**

Features that make the number 98 compressor truly outstanding:

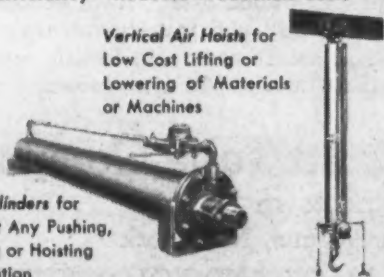
1. Two-Cylinder Compressor — less friction and less oil consumption
2. Vibration Free — smooth operation
3. Self Oiling by positive Centro-ring method
4. Timken Main Bearings — provide easy external adjustment
5. Four section Finned Intercooler — effective cooling between stages
6. Valves readily removable as assembled units
7. Precision Built — assures long life and minimum maintenance
8. Experience backed by 98 years of "Know-How"
9. Also furnished in both base and tank mounted units

Mail coupon for additional information

Other CURTIS Equipment that Increases Plant Efficiency—Reduces Production Costs

Vertical Air Hoists for Low Cost Lifting or Lowering of Materials or Machines

Air Cylinders for Almost Any Pushing, Pulling or Hoisting Operation



CURTIS PNEUMATIC MACHINERY DIVISION

of Curtis Manufacturing Company
1948 Kienlen Ave., St. Louis 20, Mo.

I am interested in items checked below:

☐ THE NEW MODEL 98
AIR COMPRESSOR

☐ VERTICAL
HOISTS

☐ AIR
CYLINDERS

Name.....

Firm.....

Street.....

City..... Zone..... State.....

Other Curtis Compressors available in sizes from 1/4 to 50 horsepower inclusive.

CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Company

1948 Kienlen Avenue

St. Louis 20, Missouri



A Program for 30 million new Americans

LISTEN to the voices of 30 million new Americans. They are answering the pessimists who say we are threatened with depression because we can't keep our farms and factories busy.

Let these pessimists read the future in the census returns. There is a tremendous upsurge in our population. Last year nearly 4 million babies were born. By 1960 we shall total 170 million people—30 million more than when war ended in 1945. This adds to our domestic market more people than there are in Canada and Australia combined.

Providing for these 30 million new Americans can keep our production machinery going at capacity. They call for new hospitals, schools and churches. Larger families need bigger houses to replace post-war houses that are too small now. More and bigger

families need improved home equipment and more new automobiles. In short, to maintain and improve living standards for our children, we must work harder than ever before. To supply the needs of our 1960 population, including adequate national defense, it is estimated that the productivity of the individual worker must increase at least 30%, with additional investment of over 200 billion dollars in capital facilities.

There should be no room in this picture for depression. But we must have economy in government, elimination of waste and extravagance and a reduction of taxes and public debt. If we encourage private incentive, thrift and investment, we can bring about the greatest advance in health, wealth and happiness that America has ever known.

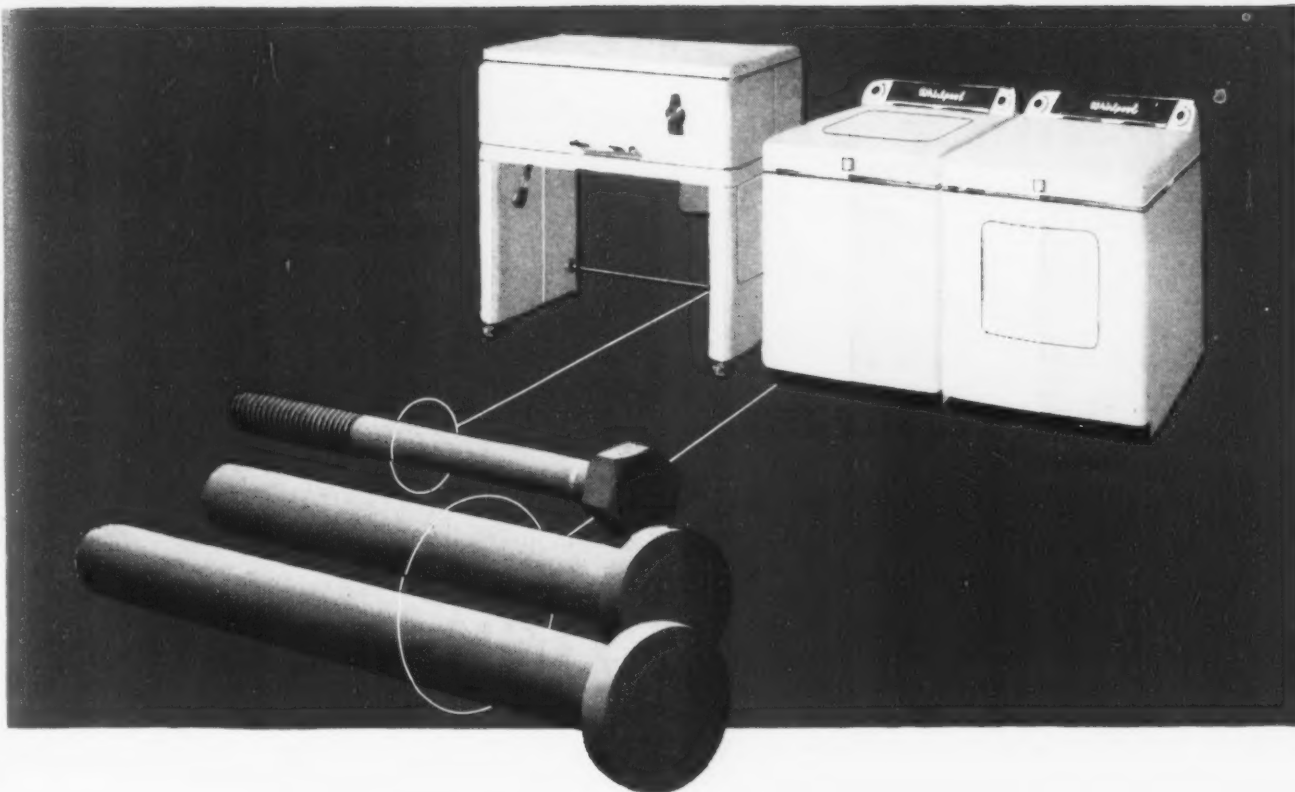


The Youngstown Sheet and Tube Company

General Offices—Youngstown 1, Ohio
Export Offices—500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.



Whirlpool Saves \$11,190 In One Year

With Townsend Cold-Headed Parts

In their constant effort to improve Whirlpool home laundry equipment without increasing costs, the Whirlpool Corporation last year submitted the three special parts shown above to Townsend. Two of them are used to support and align the entire mechanism in the Whirlpool Automatic Washer. The other is used as a pressure spring adjustment on the shoe of the Whirlpool Ironer.

By applying more than a century

of cold-heading experience to the problem, Townsend was able to produce better parts at savings ranging from \$7.00 to \$20.00 per thousand. The total savings on a year's production of thousands of washers and ironers amounted to the substantial sum of \$11,190 under the cost of the parts used previously.

In these days of rising material and labor costs, it will pay you to investigate the possible savings of buying

small parts and special fasteners from Townsend. Not only may you save material costs, but often by a slight change in design, assembly methods can be speeded for additional economies.

To find out how we can help you reduce your costs on small parts, send a sample or drawing to your nearest Townsend office today. Our engineers will gladly give you an estimate without obligation.

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Company Division, Los Angeles, Cal.

THE FASTENING AUTHORITY—Experience: over 136 years—**Capacity:** sixty-million parts daily—**Products:** over ten-thousand types of solid rivets—cold-headed parts—Cherry Blind Rivets—Twinfast Screws—self-tapping screws—tubular rivets—locknuts—special nails—formed wire parts.
Plants: New Brighton, Pennsylvania—Chicago, Illinois—Plymouth, Michigan—Santa Ana, California.

No ONE chain serves every purpose

LINK-BELT offers the right chain

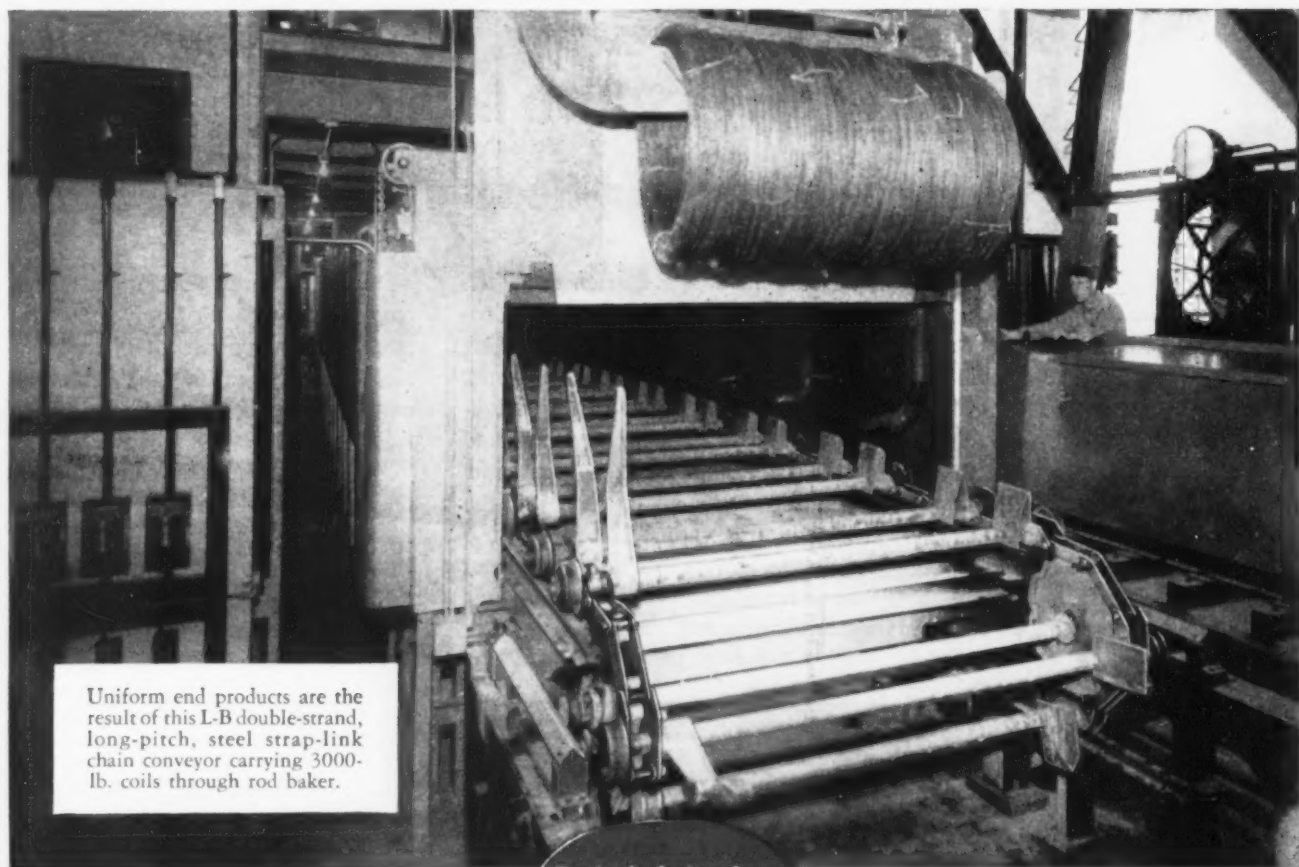
... engineered for your requirements

Don't settle for a "cure-all" chain to handle every job. Different types of chain have different characteristics. That's why Link-Belt makes a complete line of chains. Our engineers can recommend the correct type of chain to fit your particular needs . . . the one that does your job best.

Equally important is your assurance that *any* chain with the Link-Belt name will give you longer chain life. Accurate control of raw materials and processes . . . plus manufacturing refinements add up to the highest standards.

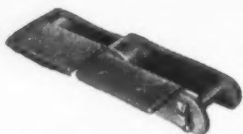
LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, factory branch stores and distributors in principal cities. 12,731

LINK-BELT
CHAINS AND SPROCKETS



Uniform end products are the result of this L-B double-strand, long-pitch, steel strap-link chain conveyor carrying 3000-lb. coils through rod baker.

Typical chains from
the complete
LINK-BELT
line



Class SS bushed roller chain with straight sidebars—for practically any conveying or elevating service.



Class C combination chain—popular, durable, low cost design for elevators and conveyors.



Class SS bushed roller chain with offset sidebars—for heavy drive service at moderate speeds.



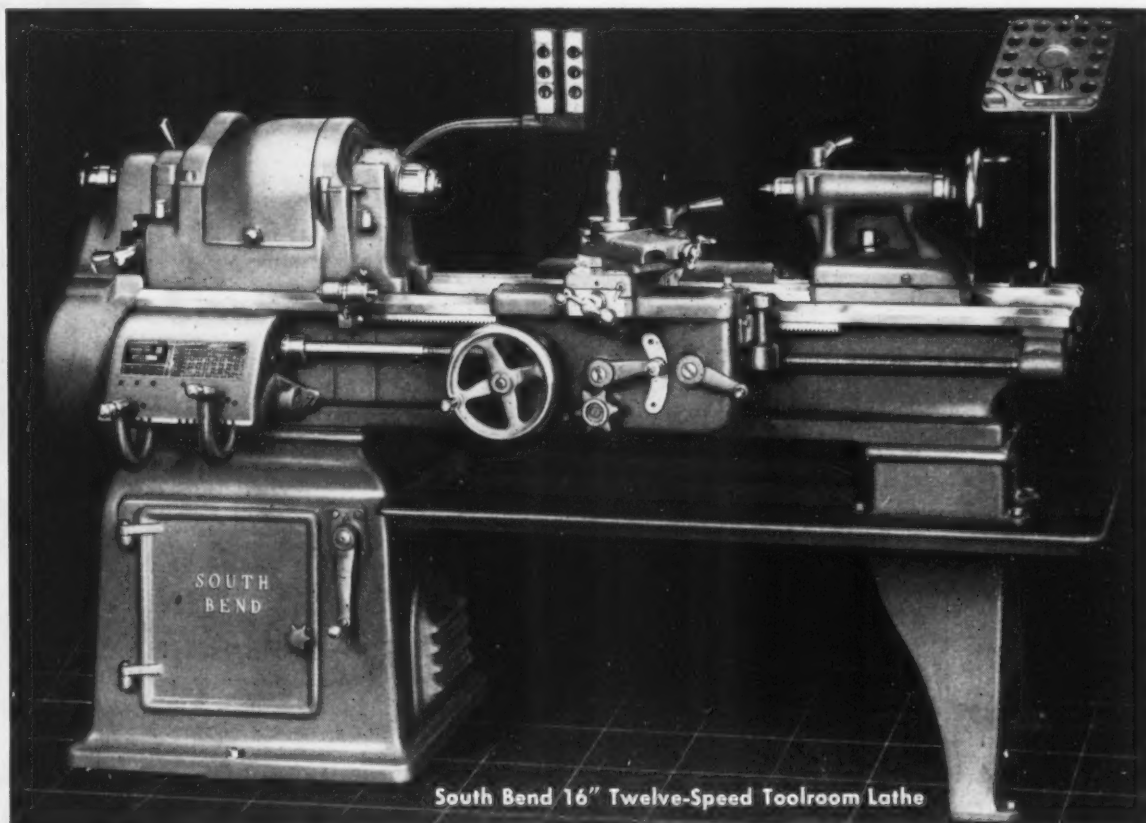
Transfer chain with tilting dogs—for plate and slab travel, loads up to 300,000 pounds.

Cuts Machining Time

The wide range of spindle speeds on this new lathe cuts machining time because the operator quickly selects the right speed for each operation. Pushbutton control provides a fast change from any high speed to the corresponding low speed. This versatility is further increased by 48 choices of longitudinal

SOUTH BEND 12 SPEED LATHE

and cross feeds which insure maximum efficiency on every job. Also, you will find that its accuracy and ease of operation make your tough jobs easy. Send the coupon for complete information.



South Bend 16" Twelve-Speed Toolroom Lathe

SPECIFICATIONS

Spindle Speeds — 12. Direct drive: high range 300, 550, 945; low range 150, 278, 475. Back gear drive: high range 32, 70, 118; low range 20, 33, 60.

Spindle Bore — 1 3/8".

Swing over bed and saddle wings — 16 1/4".

Swing over saddle cross slide — 9 3/4".

Distance between centers — 33 1/4", 45 1/4", 57 1/4", 81 1/4", 105 1/4".

Collet Capacity — 1" maximum.

Longitudinal Feeds — 48 R.H. or L.H., .0015" to .0841".

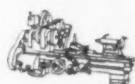
Cross Feeds — 48, .0006" to .0315".

Thread Pitches — 48, 4 to 224 per inch.

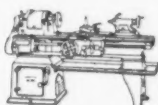
SEND INFORMATION CHECKED:

☐
☐

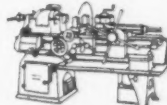
TOOLS & ATTACHMENTS



☐ 9" and 10" BENCH LATHES



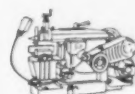
☐ 10" to 16-24" FLOOR LATHES



☐ 1/2" and 1" Collet TURRET LATHES



☐ 14" DRILL PRESSES



☐ 7" BENCH SHAPERS

Name _____

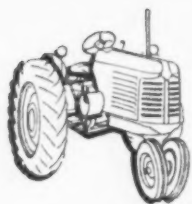
Company _____

Street _____

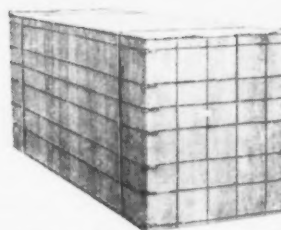
City & State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

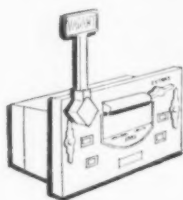




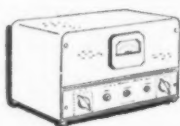
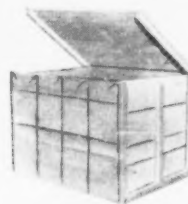
TRACTORS



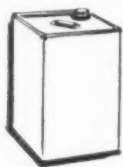
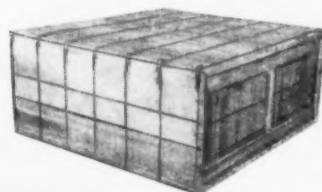
TOMATOES



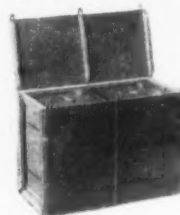
TAXI METERS



TRANSMITTERS



TURPENTINE



WIREBOUND BOXES AND CRATES

handle them all - from A to Z

Whether your product is large, small, rugged, fragile, heavy or light; it will ship better, safer and more economically in a Wirebound Container.

Prove it to yourself!



wood and steel for strength and resiliency

MAIL THIS COUPON, TODAY!

WIREBOUND BOX MANUFACTURERS ASSN.

Room 1166, 327 South LaSalle Street

Chicago 4, Illinois

Gentlemen:

☐

I want the A.B.C.'s about Wirebounds. Send a free copy of your booklet, "What to Expect from Wirebound Boxes and Crates."

☐

Please have a Wirebound sales engineer give me the facts as they apply to our product.

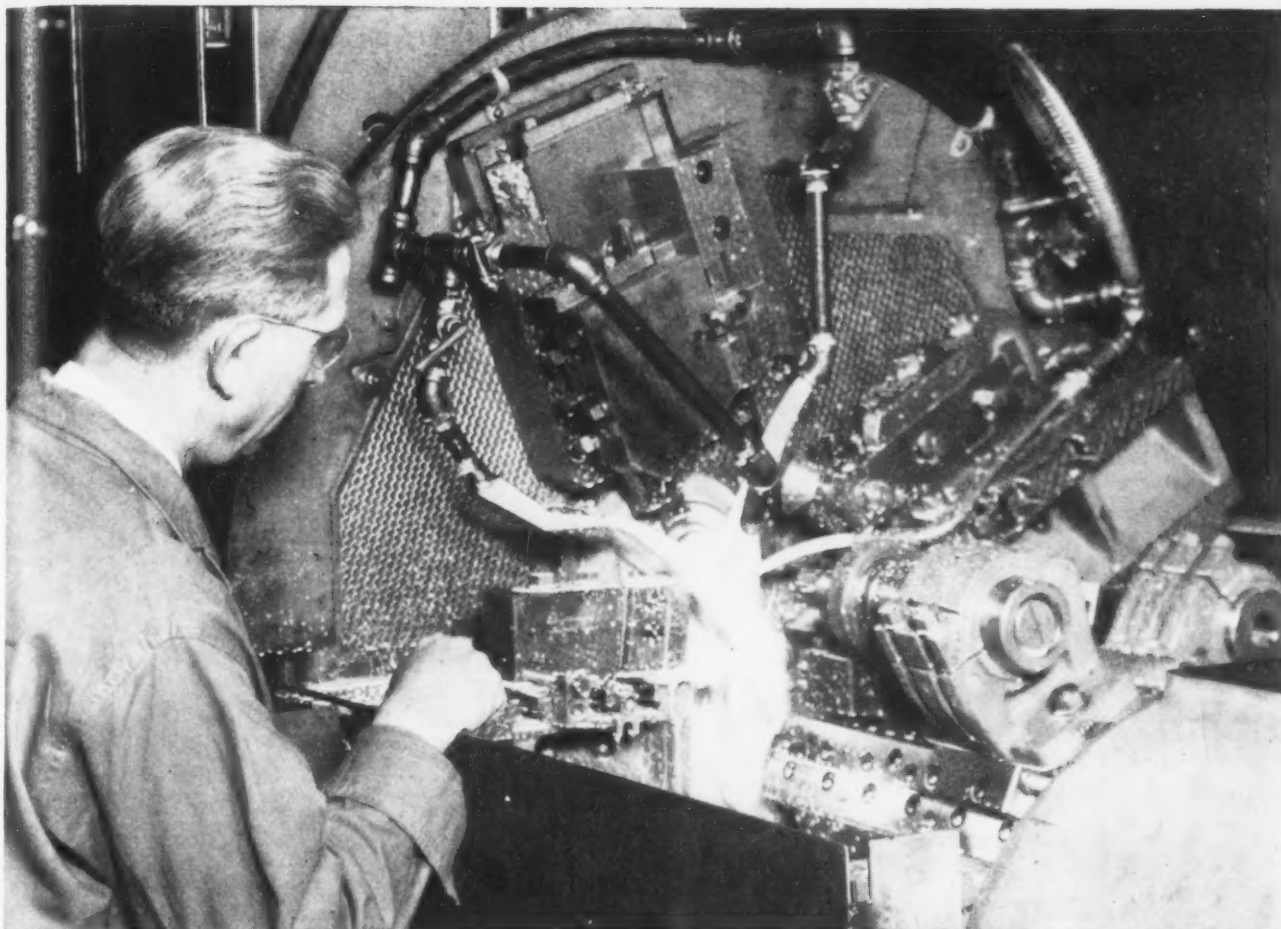
Name Position

Firm

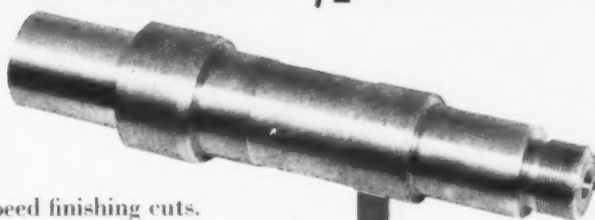
Street and Number

City Zone State

Our Product is It Weighs



MODEL M...more than 6½ times faster on this shaft!



You can spot one of the important reasons for this production increase right in the design of the Acme-Gridley Model M Single Spindle Automatic. There are three automatic spindle-speed ranges to give the correct surface speed for any kind of cut, any diameter. On this job, for example, the operation sequence goes from carbide cuts, to high-speed steel for forming cuts, to die-head threading—and back to

high-speed finishing cuts. There are other time-saving features, too—independent camming for the eight tool slides, to permit combining cuts; wide, open tooling zones, for easy access; heavy, rigid frame construction, to permit the use of carbide tools; simple camming, for quick change-overs. These and many others are explained in Bulletin M-50. Be sure to ask us for your copy.

JOB FACTS

PART Steel Sprocket Shaft,
5¾" long
OPERATIONS 10
MACHINE TIME . . . 1 Min., 50 Sec.
FORMER MACHINE TIME, 12 Min.
(Engine Lathe)
MACHINE 3½" Acme-Gridley
Model M Single Spindle Automatic.

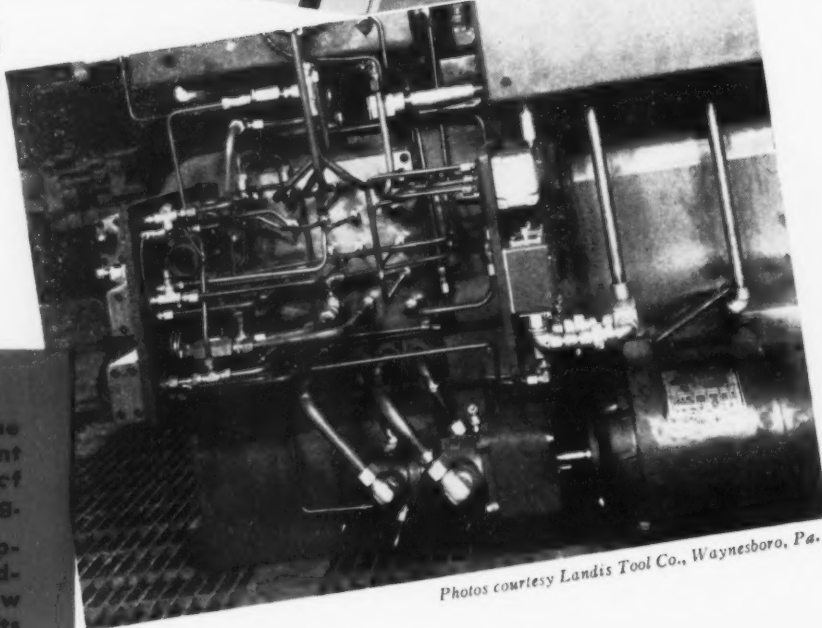
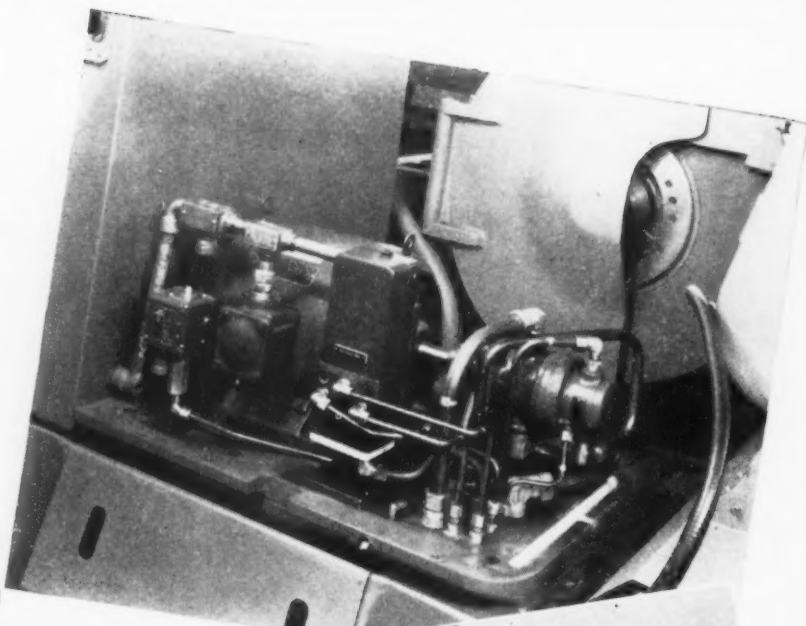
The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:
1-4-6 and 8 Spindle • Hydraulic Thread
Rolling Machines • Automatic Threading Dies
and Taps • The Chronolog • Limit, Motor Starter
and Control Station Switches • Solenoids
Centrifuges • Contract Manufacturing

CHECK ✓ THESE GOOD REASONS FOR USING SUMMERILL HYDRAULIC TUBING ✓

- ★ Summerill Tubing is made in the nation's most recently built plant for the exclusive production of cold drawn seamless steel tubing.
- ★ The latest methods and equipment are used. Always a standard for quality, Summerill is now shipping the finest tubing in its history.
- ★ Only selected raw material—the very best—is used to make Summerill Hydraulic Tubing. It is a true premium product, made in accordance with JIC Standards for tubing in industrial equipment.
- ★ Every length is closely inspected and rigorously tested before shipment to assure uniform physical characteristics and hydrostatic qualities; ends are flared to be sure of ductility, etc.



Photos courtesy Landis Tool Co., Waynesboro, Pa.

Illustrated above are typical examples of the use of Summerill cold drawn seamless steel tubing in the hydraulic pump hook-up and control lines of modern machine tools.

In this field, as in many others where liquids must be conducted under high pressures reliably, the trend today is toward the use of steel hydraulic tubing exclusively. It is safer, stronger—won't break at stress points, bends, etc., yet handles and works easily and is simple to fabricate.

Summerill's new plant and progressive methods bring you hydraulic tubing at its best, in a full range of carbon steel sizes from $\frac{3}{16}$ " to $1\frac{1}{2}$ " O.D. • Let us quote on your requirements. *Summerill Tubing Company Division, Columbia Steel & Shafting Company, Pittsburgh 30, Pa.*

W&D 4273



IN COLD DRAWN SEAMLESS STEEL TUBING
SPECIFY *Summerill* AND BE SURE!

Take Your Pick of Performance

In the complete Fairbanks-Morse Pump Line you can pick the pump that best suits your ideas of performance, efficiency, capacity, head, initial and operating costs. Whatever your choice, you can be sure it will more than live up to your expectations . . . it's Fairbanks-Morse.

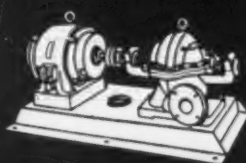
For complete information, call your Fairbanks-Morse pump expert or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.



FAIRBANKS-MORSE,

a name worth remembering

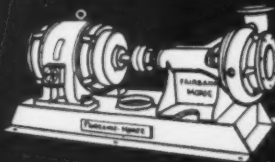
PUMPS • DIESEL LOCOMOTIVES AND ENGINES
ELECTRICAL MACHINERY • SCALES • HOME WATER SERVICE EQUIPMENT
RAIL CARS • FARM MACHINERY • MAGNETOS



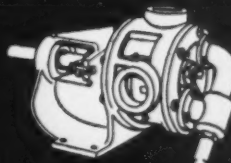
Two-Stage Centrifugal Pumps
Capacities: 100-560 G.P.M.



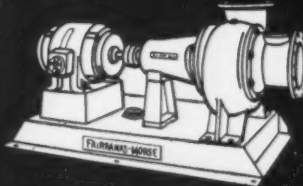
Built-together
Centrifugal Pumps
Capacities: 5-1000 G.P.M.



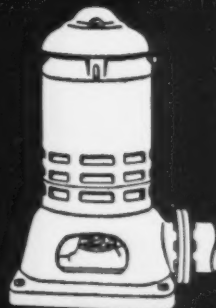
Base-Mounted Centrifugal Pumps
Capacities: 25-3000 G.P.M.



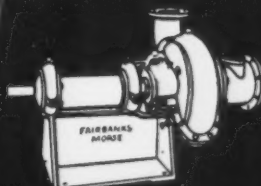
Frame Constructed
Rotary Pumps
Capacities: 1.3-450 G.P.M.



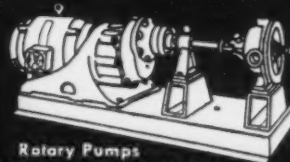
Horizontal Angle Flow Pumps
Capacities up to 100,000 G.P.M.



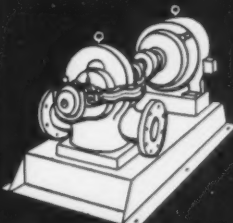
Deep Well Turbine Pumps
Capacities: 15-25,000 G.P.M.



Paper Stock Pumps
Capacities up to
2500 G.P.M.



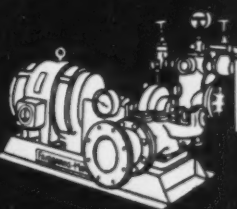
Rotary Pumps
With Geared Head Motor Drive
Capacities: 20-450 G.P.M.



Split-Case Centrifugal Pumps
Capacities: 50-50,000 G.P.M.



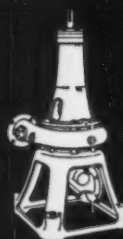
Two-Stage Built-together Pumps
Capacities: 5-1000 G.P.M.



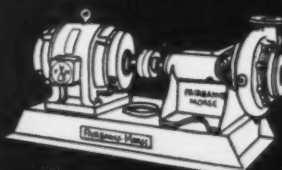
Centrifugal Fire Pumps
Capacities: 500-2000 G.P.M.



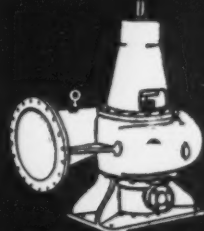
Vertical
Propeller Pumps
Capacities:
1250-216,000
G.P.M.



Bladeless Impeller
Food Handling Pumps



Sewage and Trash Pumps
Capacities: 50-20,000 G.P.M.



Vertical Angle Flow Pumps
Capacities up to
100,000 G.P.M.

COMPANHIA VALE DO RIO DOCE S. A.

ITABIRA IRON ORE FOR OPEN HEARTH FURNACES



VALUE

ANALYSIS PERCENTAGES GUARANTEED BY CONTRACT

Fe (Guaranteed minimum)	68.5
P (Guaranteed maximum)	.045
Moisture (Guaranteed maximum)	1.0

Recent shipments have averaged about .80% Moisture, 69.01% Fe, .028% P, and .27% SiO₂. Sizes are half inch to eight inches.

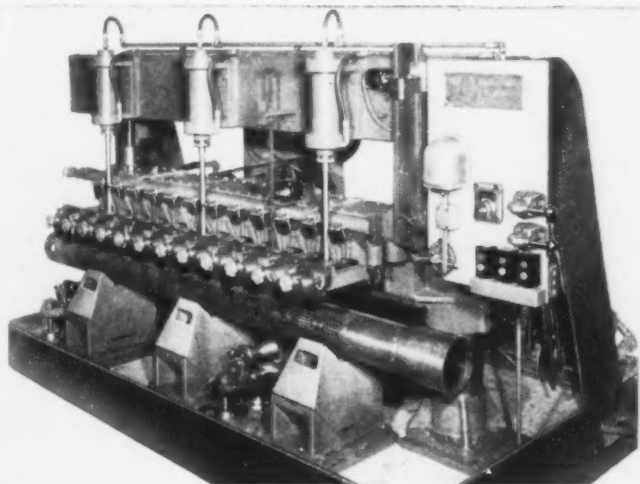
Steel companies now using ITABIRA IRON ORE as charge and feed ore report substantial savings in operating costs. These result principally from hard structure, low moistures, high iron content and absence of impurities. Important reductions in the use of STEEL SCRAP have been achieved in open hearth operations by using higher percentages of ITABIRA ORE in the charge.

Its use in all phases of Steel production is constantly increasing. The excellent yields being realized are attributed to the unique properties of ITABIRA ORE.

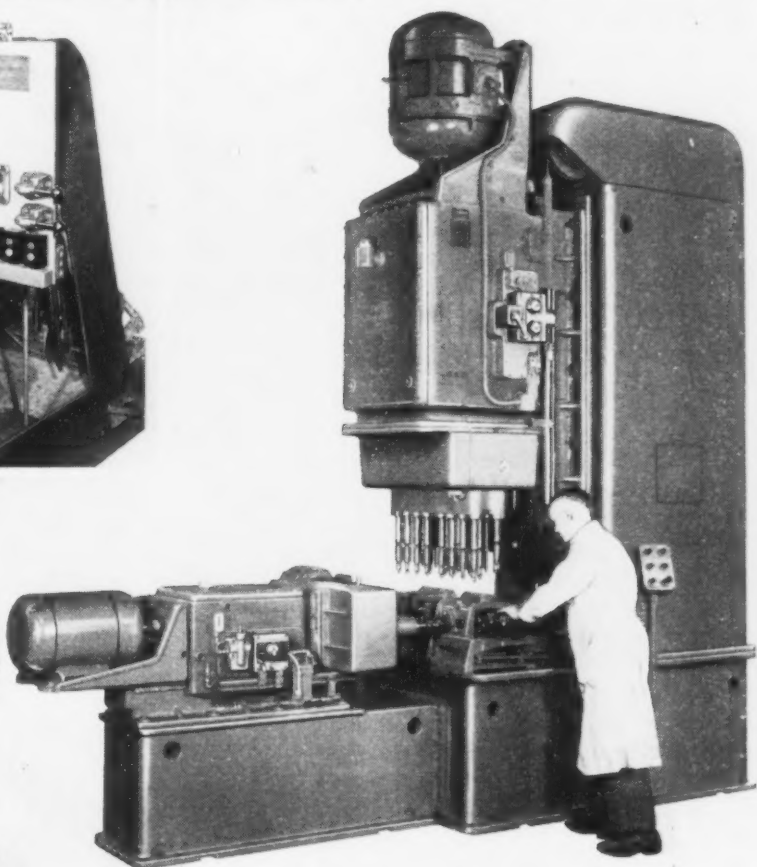
Inquiries should be addressed to the Vale do Rio Doce Trading Company, 63 Wall St., New York 5, New York.

COMPANHIA VALE DO RIO DOCE S. A.
RIO de JANEIRO BRAZIL

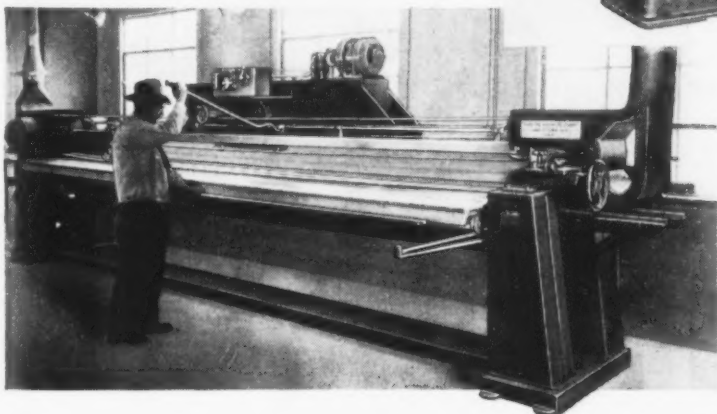
MORE COST-CUTTING APPLICATIONS OF **VICKERS** HYDRAULICS



Oil well casing slotting that formerly cost \$1.25 per foot is now done at \$0.90 per foot on the new machine designed and built by Allen Machine & Tool Co., Compton, California. Vickers hydraulic equipment raises and lowers the feed rail, controls feed rate and rapid traverse of cutters.



Hydraulic unit converted old belt sander to modern automatic stroke sander and reduced time for sanding pew backs from 15 minutes to 1½ minutes. Also improved quality. Built by Curtis Machine Corporation, Jamestown, N. Y. Vickers Hydraulics used exclusively.



This four-way, 38 spindle special purpose machine by Modern Tool Works, Ltd., Toronto, Ontario, does the drilling, spot facing and chamfering operations on an automobile engine head at the rate of one per minute. Vickers Hydraulic helps give it speed, control and precision.

Every day more and more machines are increasing production and cutting costs with the help of Vickers Hydraulics. See for yourself what Vickers Hydraulics can do for you . . . write for Catalog 5000 or call in a factory trained Vickers application engineer.



VICKERS

Incorporated

DIVISION OF THE SPERRY CORPORATION

Application Engineering Offices: ATLANTA • CHICAGO (Metropolitan) • CINCINNATI • CLEVELAND • DETROIT
HOUSTON • LOS ANGELES (Metropolitan) • NEW YORK (Metropolitan) • PHILADELPHIA (Metropolitan)
PITTSBURGH • ROCHESTER • ROCKFORD • ST. LOUIS • SEATTLE • TULSA • WASHINGTON • WORCESTER

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

4763

October 9, 1952

79

Installation view (right) shows the Jeffrey Hinged-type Apron Conveyor operating beneath a punch press in a machine shop.

IN PLANNING FOR
"WHAT'S AHEAD" . . .

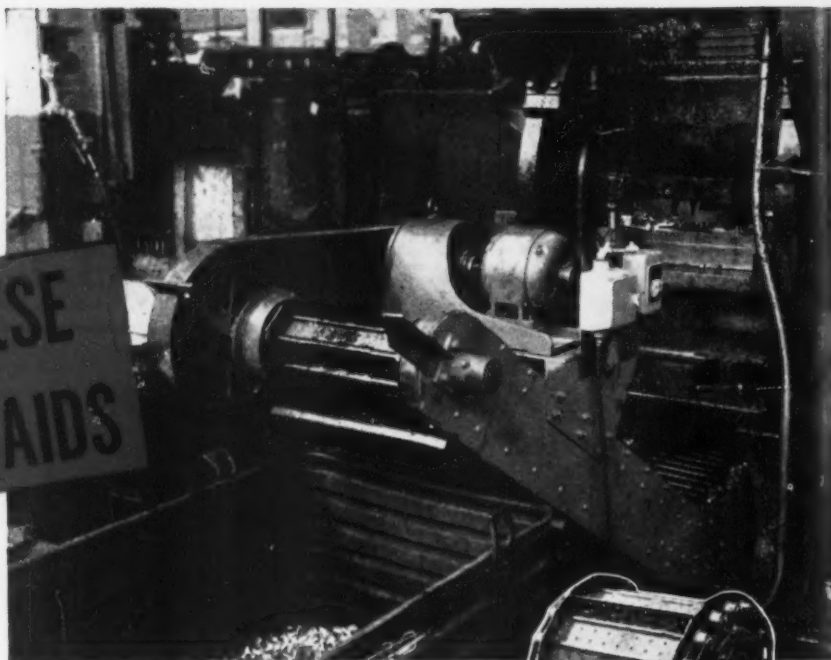
CONSIDER THESE
PRODUCTION AIDS

CONVEYORS • AERATORS • SKIP
HOISTS • WEIGH LARRIES • CRUSHERS
• PULVERIZERS • MOLD CONVEYORS
• FLASK FILLERS • MAGNETIC SEPA-
RATORS • CAR PULLERS • FEEDERS •
TRANSMISSION MACHINERY

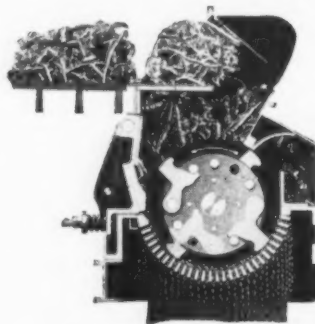
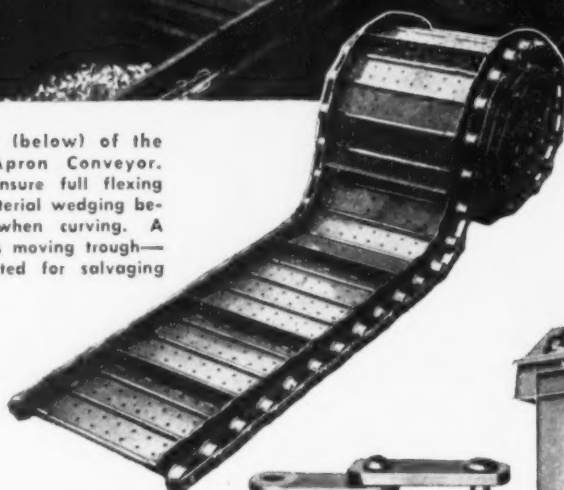
Hinged-type Steel Apron Conveyors — especially suitable for handling small, light-gauge metal parts. With lifting blades will convey up steep inclines, making a compact unit for carrying small parts from quenching tanks, heat-treating operations or from beneath punch presses, upsetters and other automatic machine tools. See two photos top right.

Metal Turnings Crushers — for uniform reduction of long coils of alloy or high carbon steel and brass turnings into short or shoveling lengths — can be arranged for side or top feed by hand or conveyor. Note cross-section.

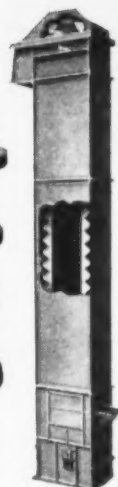
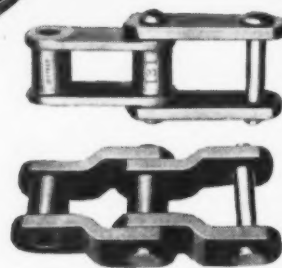
Also shown at extreme right are a continuous Bucket Elevator and two sections of Jeffrey Chain. All of these units designed to speed production and reduce costs. May we make other suggestions to help you in your planning for "What's Ahead"?



Coiled section (below) of the hinged-type Apron Conveyor. Rolled hinges insure full flexing and prevent material wedging between flights when curving. A tight, continuous moving trough — can be perforated for salvaging coolant.



Jeffrey Metal-turnings Crusher for uniform reduction of steel or brass turnings. Specially shaped crushing elements. If desired, a specially-designed feeder-conveyor can be supplied.



THE JEFFREY

MANUFACTURING COMPANY

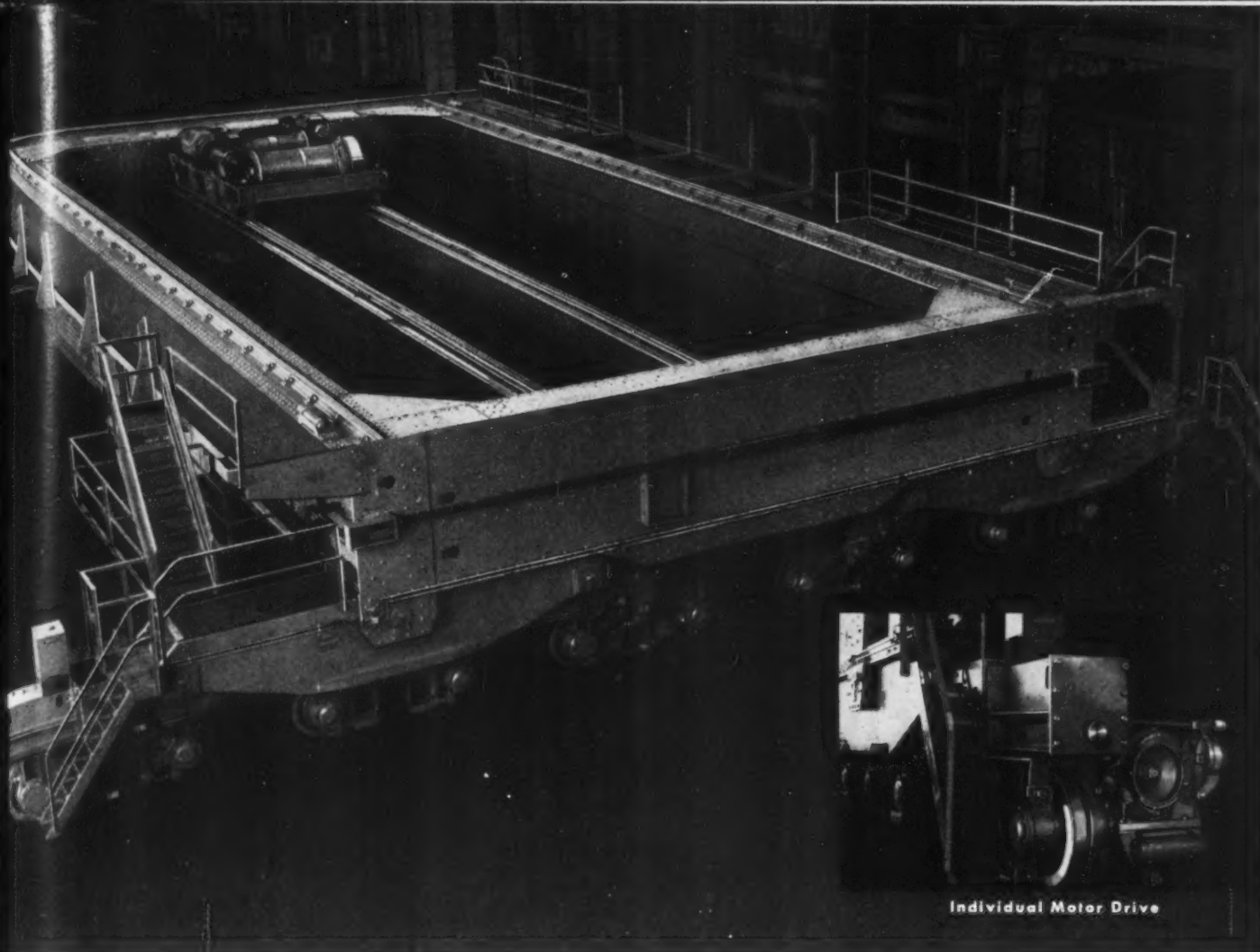
925 North Fourth St., Columbus 16, Ohio

1877

75

1952

Baltimore 2	Boston 16	Cincinnati 2	Detroit 13	Houston 2	New York 7	St. Louis 1
Buckley, W. Va.	Buffalo 2	Cleveland 15	Forty Fort, Pa.	Jacksonville 2	Philadelphia 3	Salt Lake City
Birmingham 3	Chicago 1	Denver 2	Harlan, Ky.	Madison 2	Pittsburgh 22	
Jeffrey Mfg. Co. Ltd., Montreal, Canada			The Gallen Iron Works & Mfg. Co., Gallen and Bucyrus, Ohio			
British Jeffrey-Diamond Ltd., Wakefield, England			Gallen (Great Britain Ltd.), Wakefield, England			
Jeffrey-Gallen (pty.) Ltd., Johannesburg, S. A.			The Ohio Malleable Iron Co., Columbus, Ohio			
The Killbuck & Lusk Mfg. Co., Columbus, Ohio						



**350-TON, 6-MOTOR, 76'-0" SPAN
LADLE CRANE BRIDGE**

**BUILT BY MORGAN
Engineering**

DESIGNERS • MANUFACTURERS • CONTRACTORS

BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS

ELECTRIC TRAVELING CRANES • CHARGING MACHINES

INGOT STRIPPING MACHINES • SOAKING PIT CRANES

ELECTRIC WELDED FABRICATION • LADLE CRANES

STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES

SPECIAL MACHINERY FOR STEEL MILLS

THE MORGAN ENGINEERING CO.

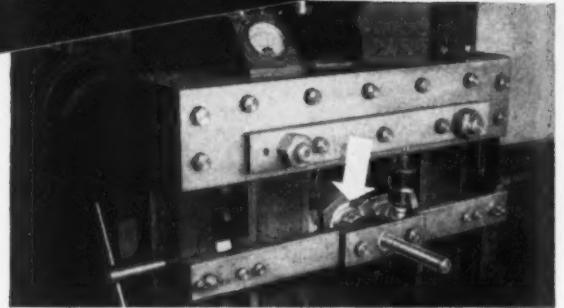
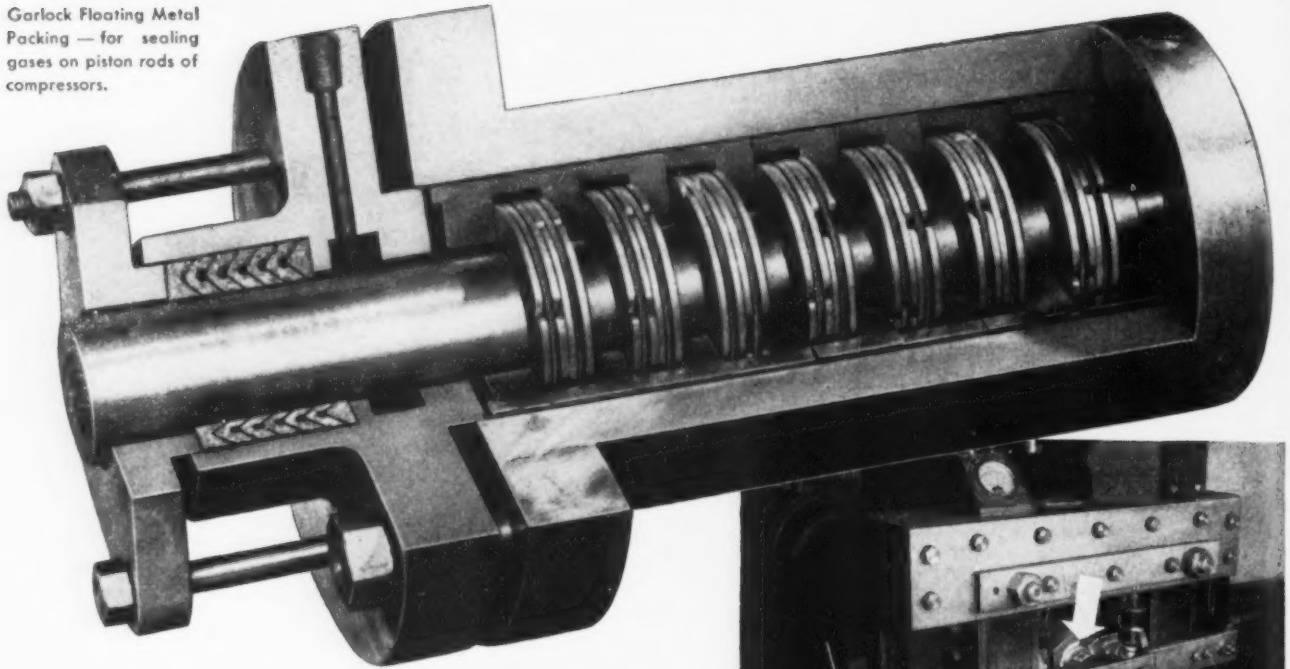
ALLIANCE, OHIO PITTSBURGH—1420 OLIVER BUILDING

Illustrated is a 350-ton, 4-girder, 24-wheel Ladle Crane bridge with six individual motor drives.

The six motors are carried on the individual trucks, each motor being coupled to a worm reduction unit on the drive axle. With this type of drive, the usual squaring shafts are eliminated.

On account of the moving mass to be controlled, which would require the usual hydraulic brake for each drive, an air braking system is provided.

Garlock Floating Metal Packing — for sealing gases on piston rods of compressors.



Above: Arrow points to foundry specimen being wear-tested on specially designed machine.

PRE-TESTED METAL—

Your assurance that Garlock Metal Packings are right for the job!

Designed specifically for high pressure and high temperature service to seal air, ammonia, steam or any gas on piston rods of compressors and steam engines, Garlock Metal Packings are quality-controlled throughout their entire manufacture.

Starting with the metals of construction, every "heat" of cast iron and bronze is accelerated-wear-tested on a special machine by an independent organization before the materials are shipped to Garlock. If the wear test specimen does not pass Garlock's rigid standards, then the entire "heat" is rejected.

Then, using these tested, high-grade materials, Garlock Metal Packings are accurately machined to exacting specifications by experienced craftsmen. Throughout every operation extreme precision is the watch-word.

The product of this rigid pre-testing and precision manufacture is a metal packing that you can be sure will meet your service requirements. So, standardize on Garlock Metal Packings—they last longer, require less maintenance.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company
of Canada Ltd., Toronto, Ont.



GARLOCK

**FLOATING
METAL PACKINGS**

**you can
TAKE YOUR CHOICE**



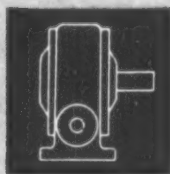
SINGLE REDUCTION

Heavy Duty

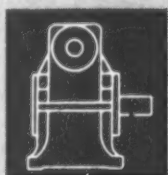
Small Units



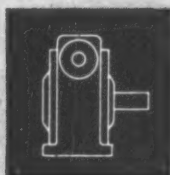
AT and AX



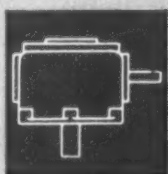
AT



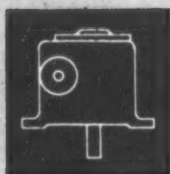
RT and RX



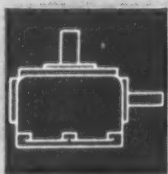
RT



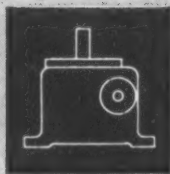
VT



VT



UT



UT

**...they're all Philadelphia
Worm Gear Speed Reducers**

Philadelphia Worm Gear Speed Reducers vary in size and arrangement, but never in quality. Each unit is backed by 60 years of gear making experience and our reputation for the best in power transmission equipment.

Standard worm gear reducers are available in ratings to 250 horsepower, and ratios $3\frac{1}{2}:1$ to 6300:1.

For full information on Worm Gear Speed Reducers, write for catalog WG51.

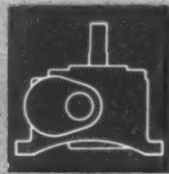
HELICAL WORM UNITS



HAT



HAX



HUT



HVT

DOUBLE REDUCTION

← Heavy Duty →

Small Units →



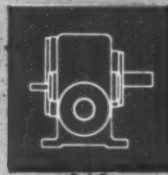
DAT and DAX



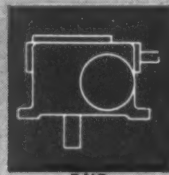
DVT



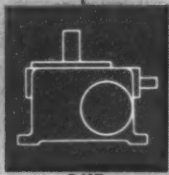
DUT



DAT



DVT



DUT

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

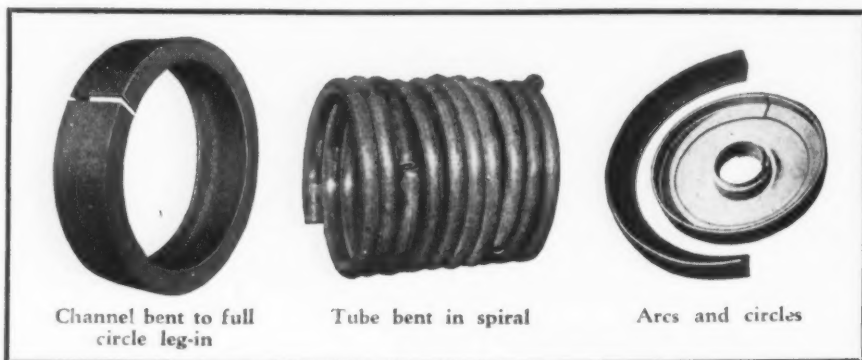
Industrial Gears and Speed Reducers
LimiTorque Valve Controls





Tips on Metal Bending

GETTING THE FULLEST USE FROM THE BENDING ROLL—



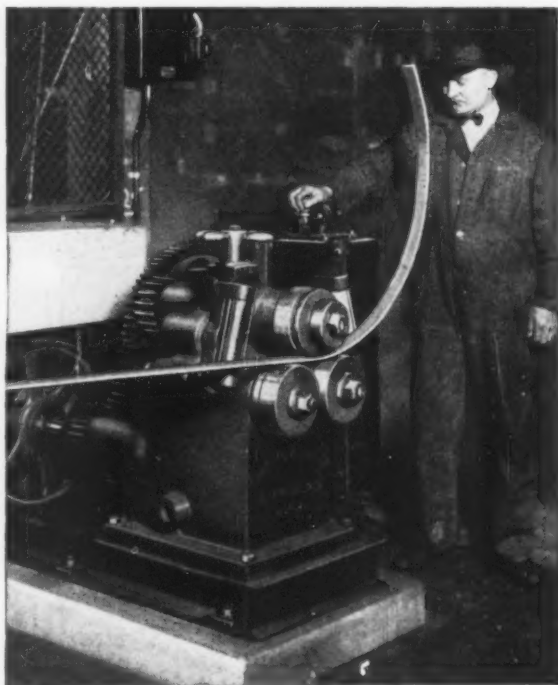
Channel bent to full
circle leg-in

Tube bent in spiral

Arcs and circles

EASILY CHANGED ROLLS OPEN UNLIMITED POSSIBILITIES

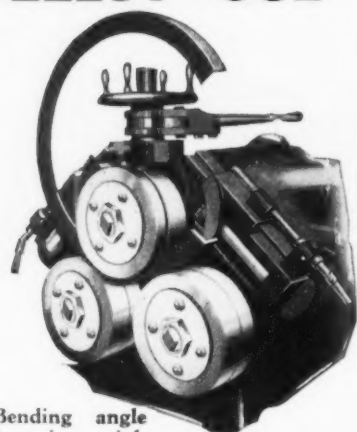
Those who own "Buffalo" Bending Rolls know that they are the fastest and cheapest method of producing arcs, spirals and circles accurately. Not so well known is the wide variety of jobs these machines will handle. Square stock is rolled in coils for ring gears by the automotive industry. Many lawn mower manufacturers bend and twist reel blades with their rolls at rates of around 300 an hour. Also, because rolls are so easily and quickly changed, it is practical to obtain special rolls and increase the versatility of the machine. Below are some examples:



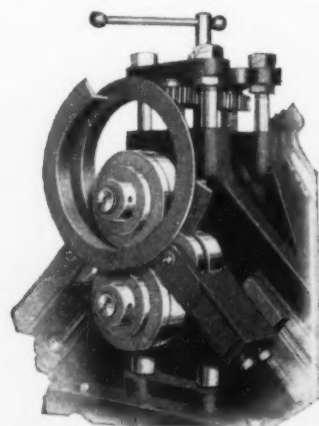
"Buffalo" No. 1/2 Vertical Bender rolling flats on flat. Very small diameters can be obtained at a single pass.

1. Angles, leg-out
2. Angles, leg-in
3. Beams on flanges
4. Channels, flanges in or out
5. Flats on edge
6. Flats on flat
7. Rounds
8. Squares
9. Copper tubes
10. Standard St. pipe
11. Heavy pipe
12. Heavy pipe

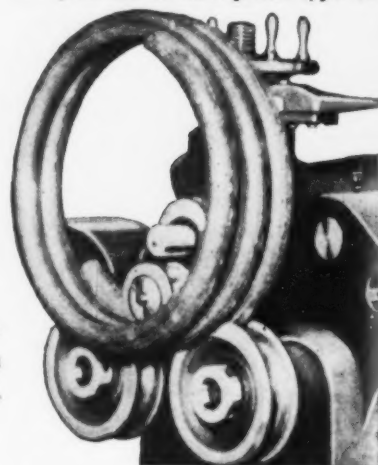
BULLETIN 352-C, with helpful information on bending, is yours on request.



Bending angle leg-in with pyramid type vertical bending roll.



Bending angle leg-out in spiral with one pass on vertical pinch type roll.



Bending tubing with small - diameter attachment and special rolls.



BUFFALO FORGE COMPANY

492 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

PUNCHING

SHEARING

CUTTING

BENDING

PERFECT SURFACE IS A "MUST". . .

Large drying rolls, like the one below receiving its final polishing pass, are used in "Yankee Dryer" paper-making machines which turn out soft facial tissue. Even slight surface flaws in these eight- and twelve-foot diameter castings cause them to be rejected.

So they use CHATEAUGAY PIG IRON

. . . the low-phosphorus, copper-free pig iron that has eliminated scrap losses in countless "tough casting" jobs. With CHATEAUGAY, consistently uniform "physicals" assure predetermined fine grain structure throughout every casting, regardless of size or shape.

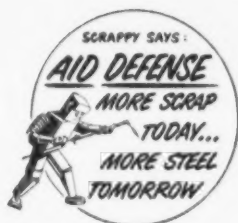
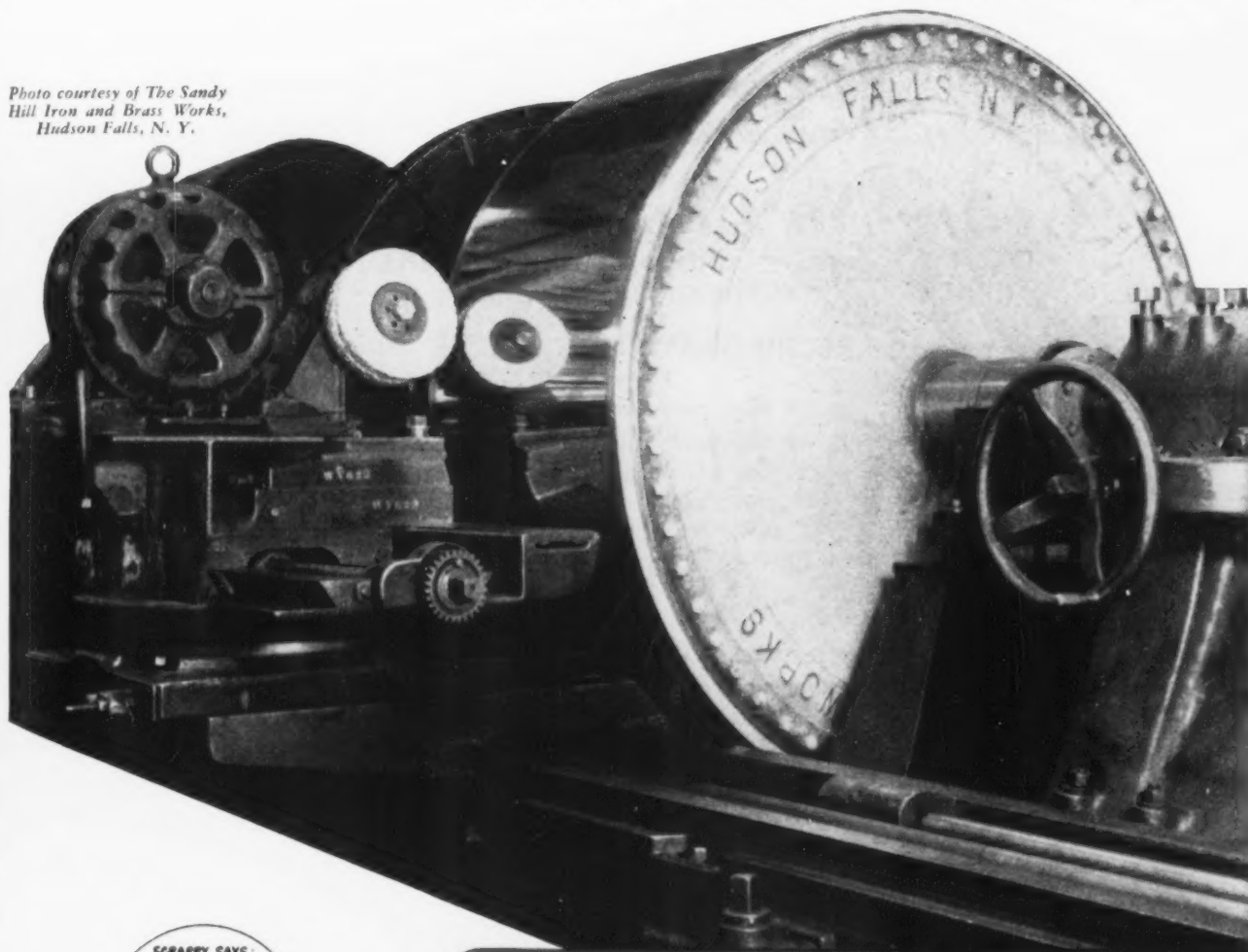
Whatever the requirements of your castings—if ordinary pig iron won't do the job—NOW is the time to investigate the *exclusive* advantages of premium CHATEAUGAY. A Republic Pig Iron Metallurgist will be glad to give you the complete facts at your convenience. Write today to:

REPUBLIC STEEL CORPORATION

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, New York

Photo courtesy of The Sandy Hill Iron and Brass Works, Hudson Falls, N. Y.



Republic PIG IRON

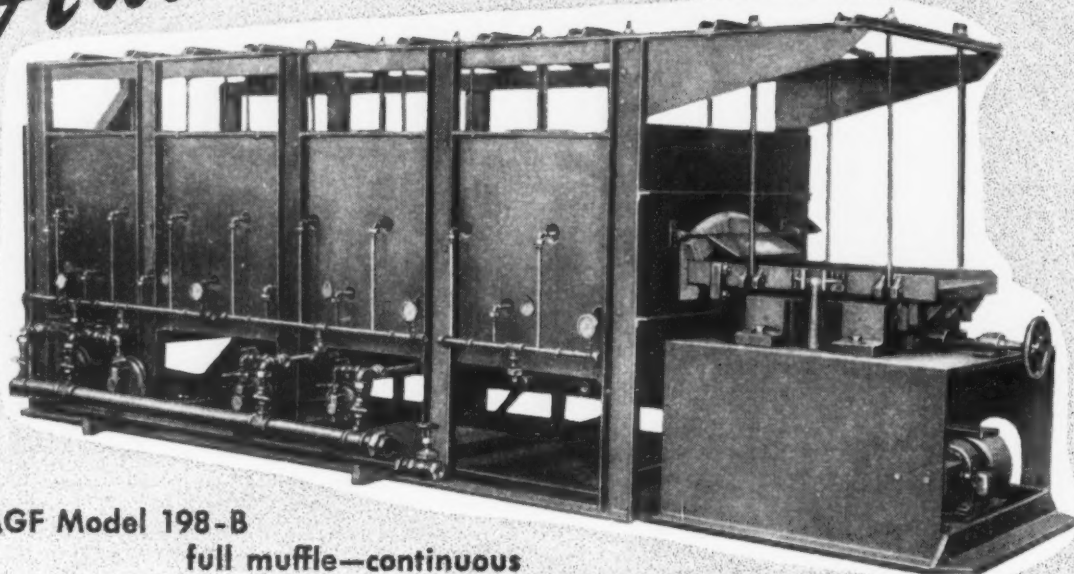
"CHATEAUGAY"
Low Phosphorus,
Copper-free

"REPUBLIC"
(Northern)
Foundry, Basic
and Malleable

"PIONEER"
(Southern)
Foundry and Basic



Automatic heat treating



AGF Model 198-B
full muffle—continuous
RECIPROCATING FURNACE

No Gears-No Chains-No Mesh Belts

OPERATES AUTOMATICALLY BY A SIMPLE
RECIPROCATING MOVEMENT

Advantages of—AGF RECIPROCATING FURNACES

- Provide better working conditions
- Nothing to do but charge
- Any desired atmosphere by simple control
- High production heat treating
- Hardening and quenching—
one continuous automatic
operation when automatic
quench tank is used
- Dependably uniform hardening
- No messy salt to clean
- No pots to replace
- No dangerous sputtering
or splattering
- Fully muffle
- Clean hardening results
- Low cost of operation
- No messy salt to replace

This type of AGF furnace used by—

FIRST . . .
in heat treating
equipment since 1878.

Manufacturers of aircraft, automobile and machinery parts, ball-roller—and
needle bearings; balls, rolls, links, bushings, cones, rings, dies, tools, chains,
ratchets, screws, bolts, nuts, pens, and general hardware products
are users of AGF Model No. 198-B furnaces.

MAKERS OF . . .

- Burners and Burning Equipment.
- Blowpipes—Torches—Forges—Melters.
- Heating, Sintering, Oxide Reducing Machines.
- Brazing, Annealing, Normalizing, Carburizing Furnaces.
- Heat Treating Furnaces and Quench Tanks.

*Consult the "PIONEERS" for controlled
atmosphere equipment. Ask for
Bulletins 815, 815A and 815B.*



AMERICAN GAS FURNACE CO.
1004 LAFAYETTE STREET, ELIZABETH 4, N. J.

BROWNHOIST

BUILDS BETTER BULK MATERIALS HANDLING EQUIPMENT

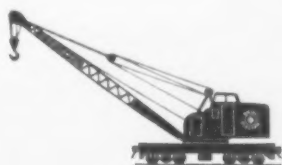
For over three quarters of a century Brownhoist has engineered, designed and built boat unloaders, storage bridges, cranes and car dumpers for efficient handling of coal, ore and other bulk materials in practically every corner of the world.

Railroads, steel mills and dock operators interested in machinery for handling ore, coal or other bulk materials will find that it pays to discuss their requirements with Brownhoist engineers.

Brownhoist equipment includes unloaders, fast plants, traveling bridge cranes, Diesel and Diesel Electric locomotive cranes, clamshell buckets, car dumpers, car pushers, shipyard cranes, and related machinery.

BROWNHOIST BUILDS BETTER CRANES

160



INDUSTRIAL BROWNHOIST CORPORATION DAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago, Canadian Brownhoist, Ltd., Montreal, Quebec • AGENCIES: Detroit, Birmingham, Houston, Los Angeles



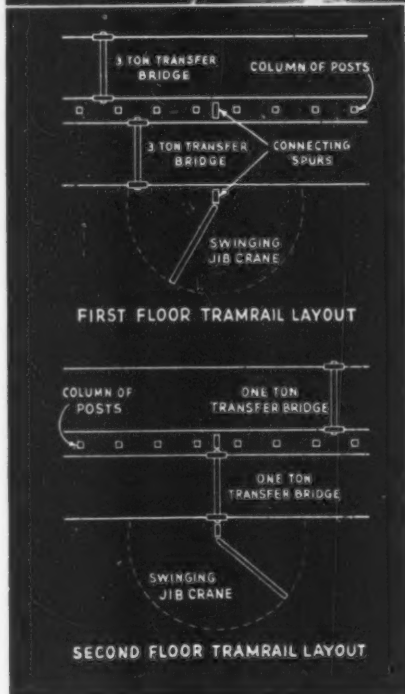
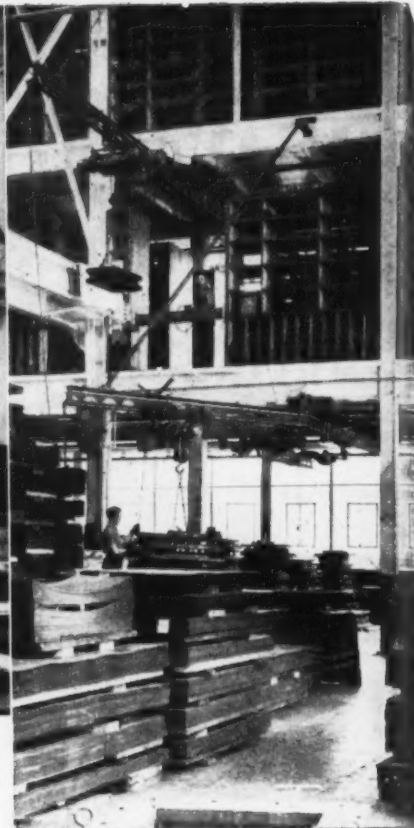
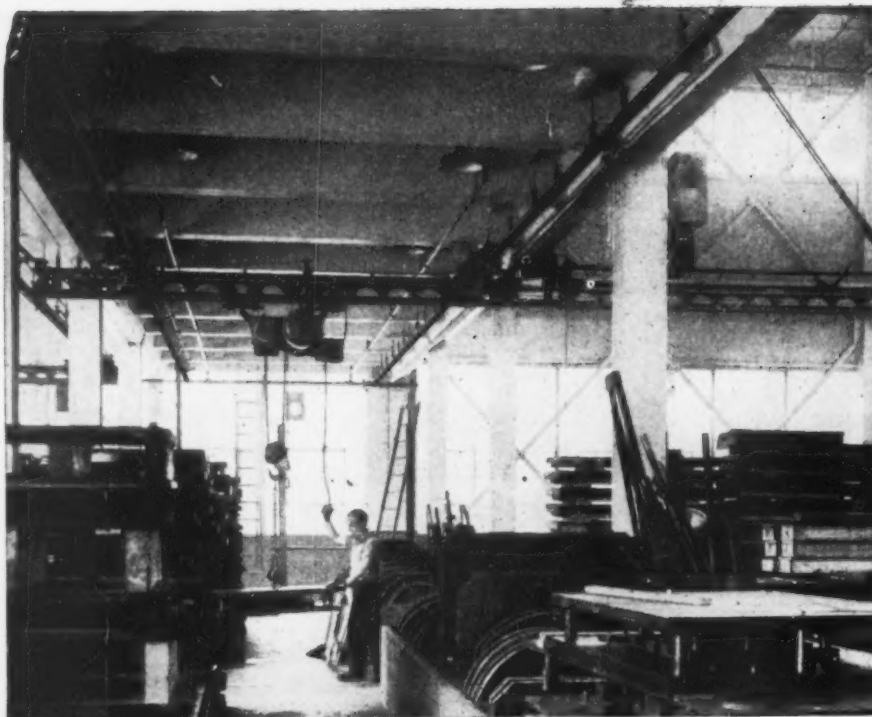
COAL AND ORE BRIDGE



TRAVELING CRANE



CAR UNLOADER



... Unique Tramrail Layout

... Solves Handling Problem

The problem of handling heavy dies in the plant of a large electric motor manufacturer was solved by a combination of standard Cleveland Tramrail transfer bridges and swinging jib cranes.

The dies are stored on the first floor at one end of the building and also on a mezzanine directly above. Two crane runways with interlocking transfer bridges and a jib crane are provided for the first floor and similar handling equipment for the mezzanine. The equipment for the first floor is of 3-tons capacity because the heaviest dies are stored there. Lighter dies are stored on the mezzanine and only one-ton equipment is required here.

The Cleveland Tramrail equipment makes it an easy job to deliver dies to and from any point on the first floor or the mezzanine. Since the areas covered by the swinging jib cranes overlap, loads may be easily transferred from first floor to mezzanine or vice versa.

The bridges and carriers are hand propelled since the effort required to propel them even when fully loaded is very little. The heavy lifting is done by push-button-operated electric hoists.

Cleveland Tramrail representatives are in a position to help you solve today's problems or develop plans for the future.



GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4845 East 284th St. Wickliffe, Ohio

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

Carrying hot steel for **THREE YEARS**

and these Hard-Faced rollers are still in use



Three years ago, some cast iron cone rollers for this cooling bed were hard-faced with HAYNES alloy No. 92. Today, they are still carrying hot steel bars despite the continual impact, abrasion, and heat to which they have been subjected. Cast steel rollers on the same line, which were hard-faced with HAYNES STELLITE alloy No. 6, have also shown exceptional service — although they have not yet been in use as long as the cast iron ones.

HAYNES alloy No. 92, an iron-base alloy recommended for the cast iron parts, is exceptionally easy to apply by oxy-acetylene welding. It has a

very low melting point and the molten alloy is quite fluid. Deposits have a Rockwell C hardness of 62-67 and excellent wear resistance.

HAYNES STELLITE alloy No. 6, the cobalt-base alloy used for hard-facing the cast steel parts, can be applied by metallic arc welding. Deposits are machinable and have excellent resistance to abrasion and heat.

For information on how to hard-face cast iron and cast steel parts, and on the alloys recommended for each job, write for a copy of "HAYNES Hard-Facing Manual."

HAYNES

TRADE-MARK

alloys

Haynes Stellite Company

A Division of

Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

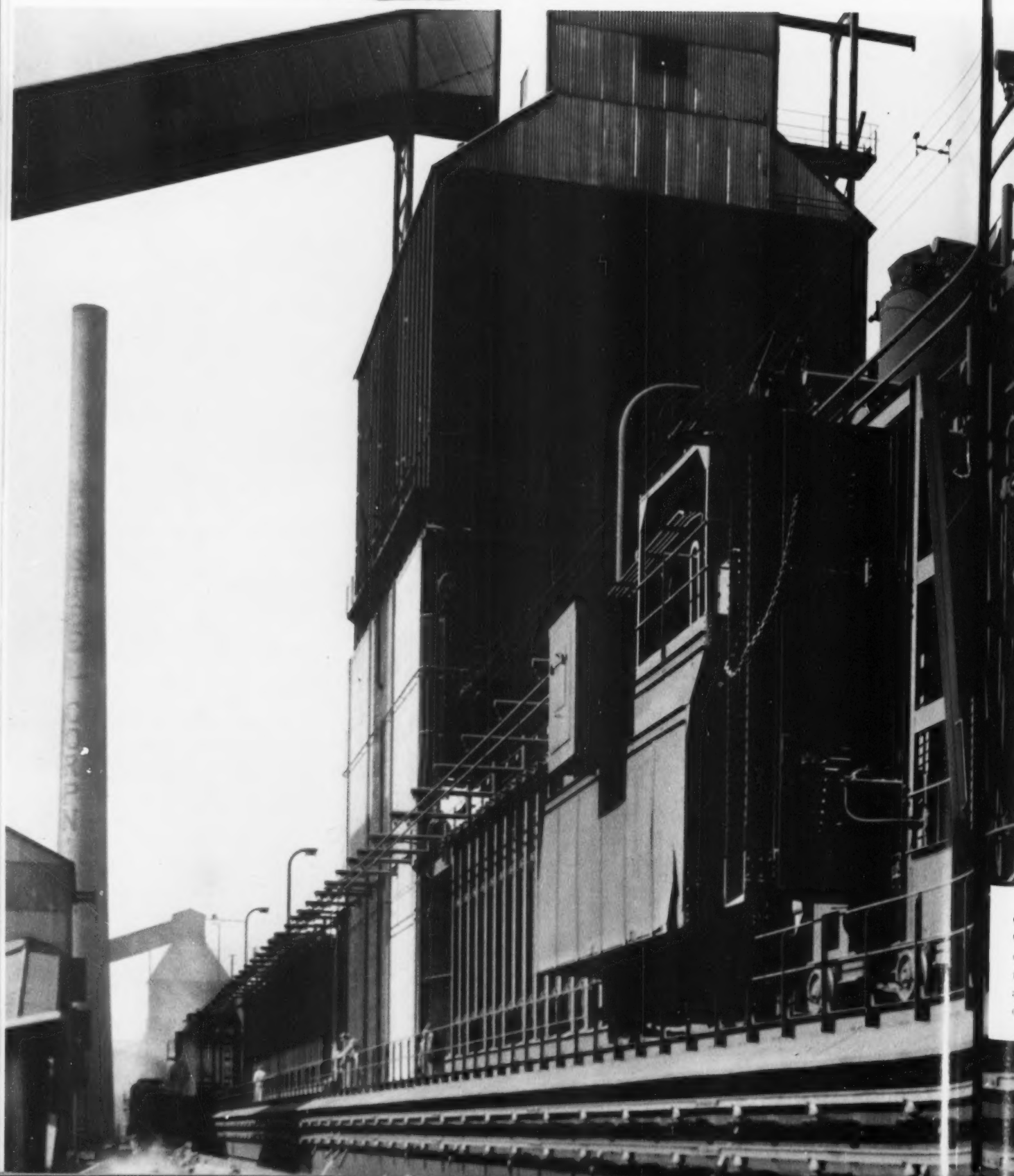
Sales Offices

Chicago — Cleveland — Detroit — Houston

Los Angeles — New York — San Francisco — Tulsa

"Haynes" and "Haynes Stellite" are trade-marks of Union Carbide and Carbon Corporation.

ABC's of



of good coke-oven construction



● Typical Koppers-Becker Underjet Coke Ovens. Built in two batteries of 53 ovens each, these 106 ovens carbonize approximately 2,600 net tons of coal per day. They are underfired with coke-oven gas and are equipped with waste-gas recirculation.



good basic design

The efficiency of any coke oven hinges entirely on its design. We believe that Koppers-Becker Coke Ovens have the best basic design. As a result, these ovens are sturdy, free from complications, simple to control. They also have the largest practical coking capacity.

This basic design meets diversified conditions. It can be employed when heating by any kind of fuel gas normally available, when building large or small ovens. This design results in low maintenance and in long life.



constant engineering refinements

Koppers builds a great many coke-oven plants and is therefore in a position to anticipate new needs. For example, the waste-gas recirculation system was developed by us to meet the need for uniform heating when using rich fuel gas.



skilled engineering staff

There is no substitute for a skilled engineering staff. Through the years, our engineers have proved their ability to design and erect the most advanced and efficient coal-carbonization equipment . . . material-handling systems . . . gas-treatment equipment.

Constructing coke ovens and related equipment is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

*Engineering and
Construction Division*

KOPPERS COMPANY, INC., PITTSBURGH 19, PA.

A man with a hate



● There's no halfway feeling about fire and its resulting destruction with an expert fire protection engineer...he actually hates to see a little fire roar into a raging inferno and create a sizeable loss.

This personal sense of responsibility is inherent with C-O-TWO Fire Protection Engineers...a definite plus in your behalf. Whether its fire detecting or fire extinguishing...portables or built-in systems...C-O-TWO means top quality backed by experienced engineering that results in operating superiority for you at all times.

With C-O-TWO Fire Protection Equipment, simplicity, practicability, longevity and minimum maintenance are built-in features that guarantee fast, positive action the instant fire strikes. Furthermore, extensive manufacturing and field installation skills, together with approvals such as the Underwriters' Laboratories, Inc., Factory Mutual Laboratories, Armed Forces and Government Bureaus assure you of the finest in modern fire protection equipment.

Rushed production periods and future expansions are some of the many problems carefully considered in a plant-wide firesafety recommendation by C-O-TWO Fire Protection Engineers...the prime objective always being the best type fire protection equipment for the particular fire hazard concerned.

WHEN BUSINESS STOPS... INCOME STOPS!

Don't take chances with your investment. Secure the benefits of highly efficient fire protection engineering today...our extensive experience over the years is at your disposal without obligation. Get the facts now!



MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT
Squeeze-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

C-O-TWO FIRE EQUIPMENT COMPANY NEWARK 1 • NEW JERSEY

C-O-TWO FIRE EQUIPMENT OF CANADA, LTD. • TORONTO 8 • ONTARIO

Sales and Service in the Principal Cities of United States and Canada

AFFILIATED WITH PYRENE MANUFACTURING COMPANY

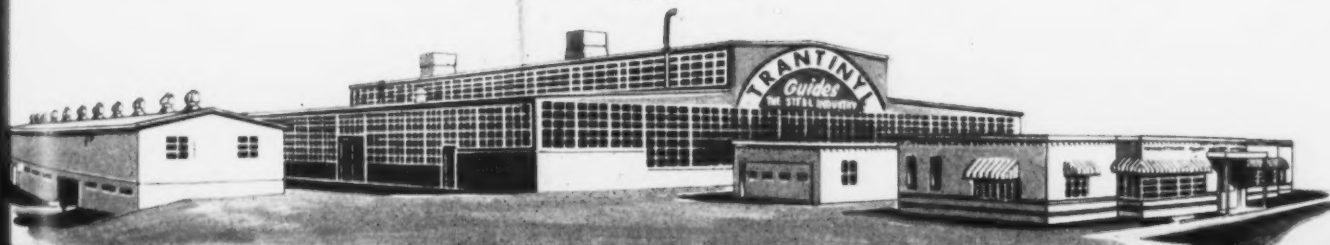
ts
ur
h-

YOU

ROLI
ELEC

TRANTINYL

guides
the
steel
industry



YOUNGSTOWN ALLOY CASTING CORP., • YOUNGSTOWN, O.

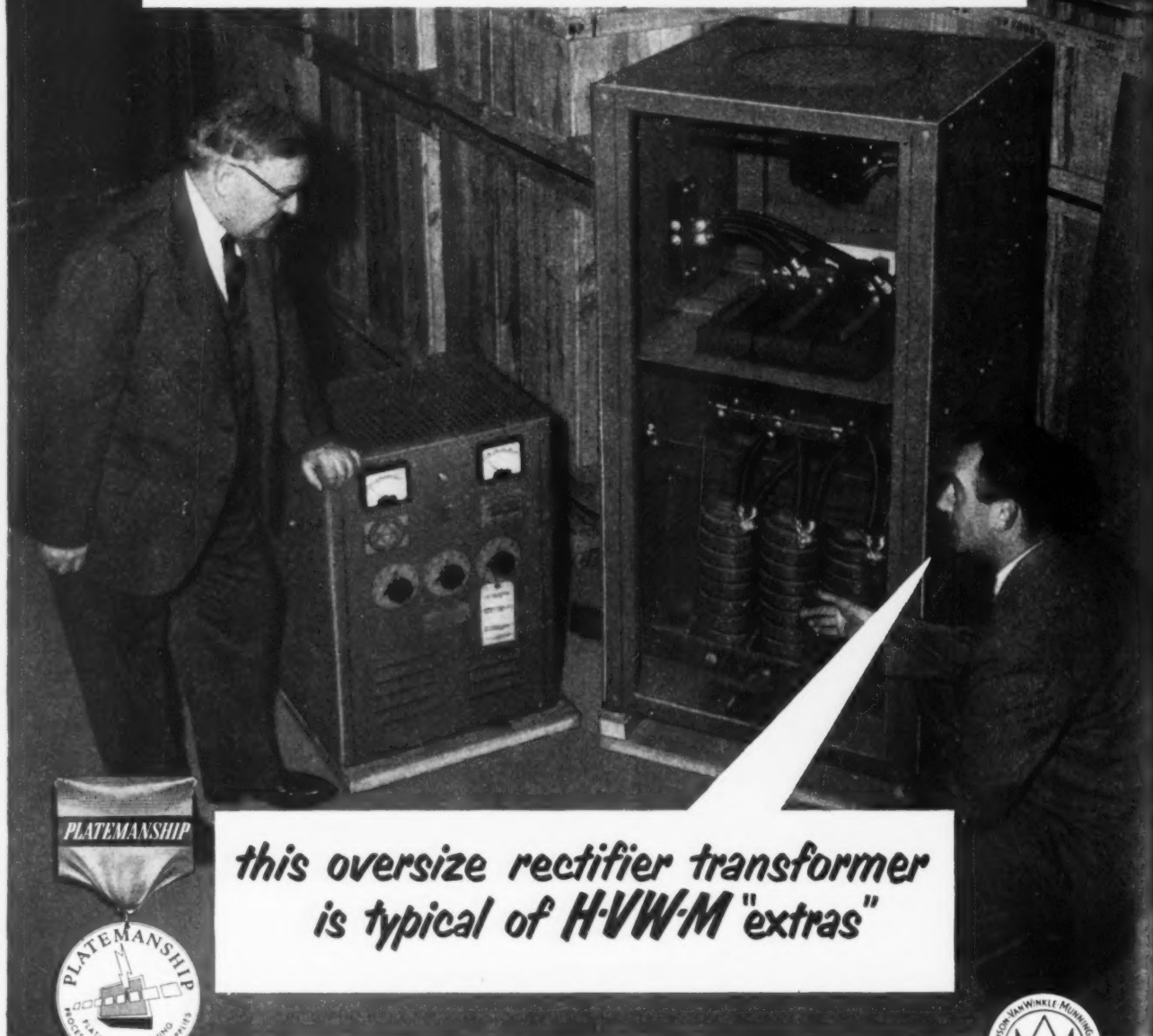
ROLLING MILLS: bar, hoop, strip, shape mill guides, and rollers. SEAMLESS TUBE MILLS: guide shoes, rolling mill plugs and rolls, piercer points, etc.
ELECTRIC WELD TUBE MILL: forming rolls, planishing rolls, tool holders, etc. • STRAIGHTENING MACHINE GUIDES • HEAT RESISTING CASTINGS
CAST-TO-SHAPE CHROME ALLOY TOOL STEEL

There's plenty of reserve capacity, more than enough for all your needs. And take a look at the acid and alkali resistant coating on these oversize transformers and selenium stacks—that's real assurance of dependable long life. But that isn't all. Those connections from the transformers to the selenium rectifiers are so flexible that floor vibrations can't possibly loosen the cell connectors. And for ventilating, the chimney effect produced by drawing clean cool air through the cabinet cuts the danger of overheating. These advantages are built into every

H-VW-M rectifier—the ones you see in these crates ready to be shipped—and those in service all over the country. They're built to last for years.

Durable, dependable rectifiers are only one of the many results of H-VW-M's constant progress in electroplating development for more than eighty years. It's a continuous policy, best summed up in H-VW-M Platemanship . . . your working guarantee of the best that industry has to offer—not only in rectifiers—but in every phase of plating and polishing.

8529



*this oversize rectifier transformer
is typical of H-VW-M "extras"*



Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING CO., MATAWAN, N. J.
PLANTS AT: MATAWAN, N. J. • ANDERSON, INDIANA
SALES OFFICES: ANDERSON • BOSTON • CHICAGO • CLEVELAND
DAYTON • DETROIT • GRAND RAPIDS • MATAWAN • MILWAUKEE
NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH
ROCHESTER • SPRINGFIELD (MASS.) • STRATFORD (CONN.) • UTICA

H·VW·M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

Alemite "Friction Fighters" WENT TO WORK HERE!

ADDED: 30 Minutes Operating Time Daily

ELIMINATED: Bearing Repairs and Oiling Hazards

SAVED: A Total of \$2000 Every Year



It Happened in Harrisburg, in a steel plant* where a mammoth traveling crane was required to carry 25 ton loads, make fast stops, quick returns and was under constant threat of friction's wear and tear. To protect it, a variety of lubrication methods were tried and adopted. All proved costly . . .

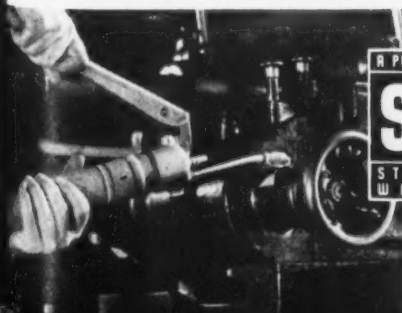
dangerous . . . ineffective.

Then, a trained Alemite "Friction Fighting" specialist was called in to work with

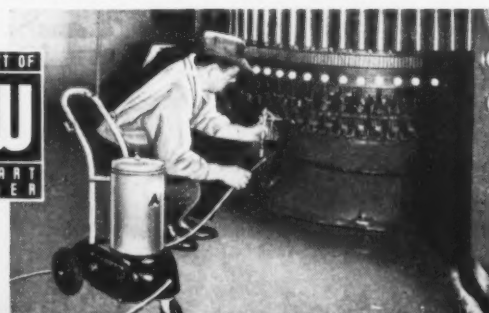
the plant engineers. After careful study, an Alemite Mechanized Lubrication System was installed and immediately began to effect savings four ways: 1. In adding 30 minutes additional productive use of the crane daily—valued in cash at \$9.00 a day and over \$2000.00 per year. 2. Savings of 60% in the amount of grease used. 3. Saving in bearing repairs—none required since the Alemite System was installed. 4. Oiling hazard—completely removed.

Combining strength with light weight, Alemite hand guns assure powerful, volume delivery of lubricant—with less work, in less time!

The most complete line in industry. Alemite power guns are compact, easily maneuvered. Bring the efficiency of power lubrication throughout the plant.



A PRODUCT OF
SW
STEWART
WARDEN



You Can Get Similar Results! No matter what size or type of plant you operate, an Alemite Lubrication Engineer can show you dozens of ways of making worthwhile savings through more efficient handling of petroleum products. These are facts which you can readily confirm in your own time studies. The Alemite man will cooperate fully with your plant engineers in setting up a test. Contact your local Alemite Industrial Distributor, or mail coupon below—today!

*Name on request

ALEMITE

MEANS EVERYTHING FOR LUBRICATION

1. Methods 2. Lubricants 3. Equipment



FREE! New Booklet

Please send me:

- ☐ "11 Ways to Cut Production Costs."
☐ Include Facts on OIL-MIST—the amazing new system that atomizes oil, circulates it to bearings under pressure.

ALEMITE, Dept. 11-102
1850 Diversey Parkway, Chicago 14, Illinois

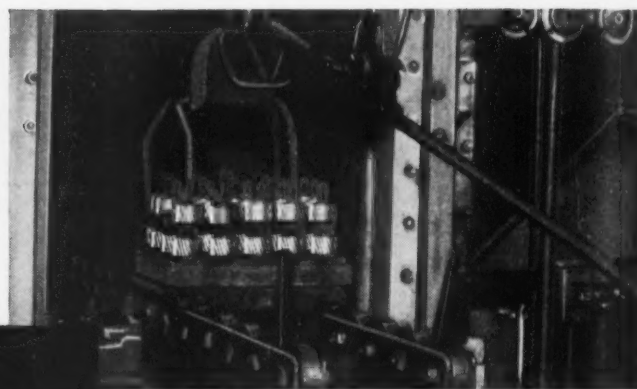
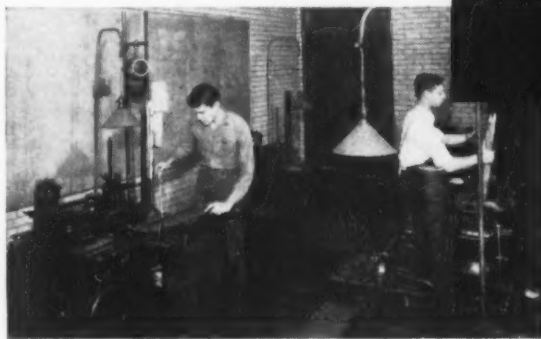
Name _____
Company _____
City _____ State _____

Versatility of **GAS** in Industry



ELECTRONICS—Glass face of television tube is bonded to metal cone with automatic GAS equipment, assuring strong, vacuum-tight glass-to-metal bond, for large manufacturer of electronic equipment.

GRAPHIC ARTS—Monotype casters with Gas-fired metal pots, Linotype machines, smelters, ink dryers, stereo casters, etc. utilize the economical, versatile flames of Gas for printing in modern plants.



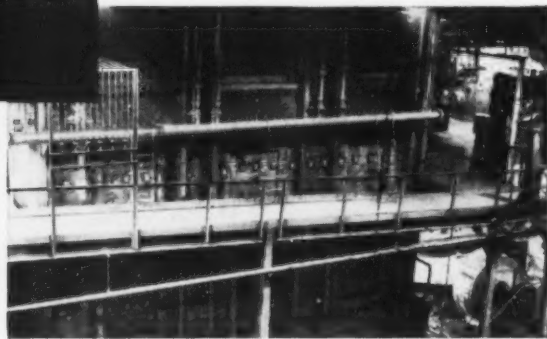
GAS...

THE
MODERN

FUEL
FOR
ALL
INDUSTRY

METALS—Gas meets rigid heat-processing requirements of production-line heat treatment, as in the case hardening of gears, for an automobile manufacturer, because Gas affords precise, automatic temperature control.

GLASS—Modern Industrial Gas Equipment is found throughout the glass industry—an example of which is this 100-ton continuous batch Gas-fired melting tank for making glass for a large industrial manufacturer.



Whatever your industrial production problems, however tight your schedules, Gas and Modern Industrial Gas Equipment can provide the answers. For the facts on GAS, call your Gas Company Representative, today.



AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE., NEW YORK 17, N.Y.

The New Day's Dawning!



A Progress Report on Monarch's Improved Lathe Production

Your Monarch lathe order may be closer to delivery than you think! Very soon, now, our expansion program will be completed—and every day output increases as we move new tools and production lines into each unit on the heels of construction crews.

Monarch output for '52 will be about double that of '51, and the architect's rendering above largely explains this growth. Upon completion of our program, we will have added a whopping 43% to our floor space since the close of World War II, and completely modernized the 25% requiring it. Tool and equipment additions, of course, are in proportion. With a completely modernized plant plus this great an increase in floor space, you can see why we're confident of cutting into our backlog fast.

Every day, we're better able to handle new orders and to move faster on present orders—and there'll be continuous improvement with each day's operation. So hang on to your precious priority order. Let us have your new orders. Your new Monarchs are getting a lot closer than they were. . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

Plant Expansion

Plant Modernization

Monarch

TURNING MACHINES



FOR A GOOD TURN FASTER...TURN TO MONARCH

This high-priority job demands ex

Three G&L 340-T machines speed precision drilling and milling of jet compressor castings . . . position automatically to within tenths of a .001"



THOUGH complete production data must be withheld for security reasons, A. V. Roe Canada, Ltd., reports three G&L Horizontal Boring, Drilling and Milling machines are making an important contribution toward increased production of the Orenda jet engine.

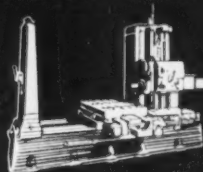
These machines are equipped with the G&L automatic electric positioning device. This outstand-

ing feature allows fast positioning of the casting accurate to within tenths of .001".

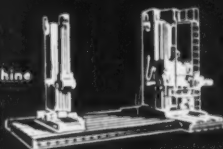
Like A. V. Roe, you too will find that for your work . . . big or small . . . simple or complex . . . you'll save time and money with the G&L line. Maybe you'll want a G&L Horizontal Boring, Drilling and Milling machine—or a G&L Hypro Planer, Planer-Miller or Vertical Boring Mill. But what-

GIDDINGS & LEWIS

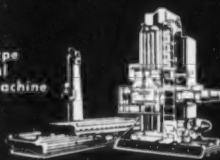
Table Type Horizontal Boring Machine



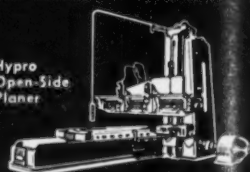
Floor Type Horizontal Boring Machine



Planer Type Horizontal Boring Machine



Hypro Open-Side Planer



extra-close tolerances



Photos show G&L 340-T's working on jet compressor castings. Note small revolving table mounted on stand and table which speeds positioning.

ever your need, you can be sure that G&L's unbiased Job Analysis Service will give you an answer that will mean savings. See our nearest representative or write direct. Get the facts about G&L Job Analysis today. There's no obligation . . . and **DELIVERY ON G&L MACHINES MIGHT BE BETTER THAN YOU THINK!**

G&L 5-POINT JOB ANALYSIS

takes the guesswork out of machine tool buying . . . works for you and with you to solve big or complex machining problems..increases production . . . reduces machining costs

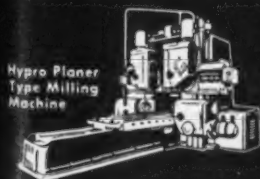
- 1 COMPLETE STUDY OF YOUR JOB OR JOBS** — G&L Job Analysis Engineers, working with your engineers, analyze your requirements by: (1) number and size of parts to be produced (2) number and kind of operations needed. (3) tolerances and finishes required.
- 2 DETERMINE MOST EFFICIENT MACHINING METHOD** — Taking into consideration the individual machining requirements of the job, G&L Job Analysis Engineers choose the most efficient machining method. G&L engineers can give an unbiased opinion because G&L builds a complete line of sizes and types of planers, planer-millers, vertical boring and turning mills and horizontal boring, drilling and milling machines . . . plus a complete line of accessories and tooling for these machines.
- 3 SELECT THE SIZE, KIND AND TYPE OF MACHINE** — The machining method now determined, G&L Job Analysis Engineers — using your production and work requirements — recommend the exact size, kind and type of machine that will do the job most efficiently.
- 4 PLAN YOUR OPERATIONS** — After the selection of the most efficient machine to fit your needs, G&L Job Analysis Engineers plan a sequence of operations that will (1) minimize number of setups and setup time, (2) use modern cutting tools to best advantage, (3) take full advantage of the machine working ranges and capacities, (4) keep operator fatigue to a minimum.
- 5 RECOMMEND (AND DESIGN IF NECESSARY) THE TOOLS TO USE** — If conditions warrant, G&L will recommend the standard machine accessories, arrangements and tools you can use to make your equipment more productive—more versatile in application. If special equipment is needed, it will be designed to agreed specifications and made a part of your order.

Write, wire or phone G&L or its nearest representative today. Get the facts on your needs — your problems. Get a G&L unbiased Job Analysis to help you. Don't hesitate — there's no obligation . . . **AND DELIVERY MAY BE BETTER THAN YOU THINK!**

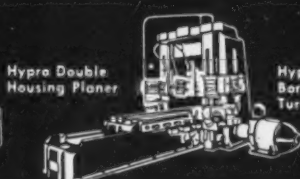
How to get a G&L job analysis

Call your nearest G&L dealer or write us direct. Furnish our Job Analysis Engineers with blueprints, job data, and production requirements. Factory engineers will completely analyze your machining problems. There's no charge, no obligation. Don't hesitate — do it today.

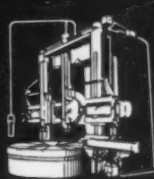
MACHINE TOOL CO.



Hypro Planer Type Milling Machine



Hypro Double Housing Planer



Hypro Vertical Boring and Turning Mill



HYPRO

FOND DU LAC
WISCONSIN

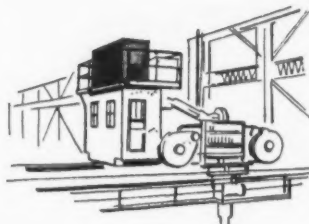
only at **DRAVO** can you get . . .

a **COMPLETE LINE** of

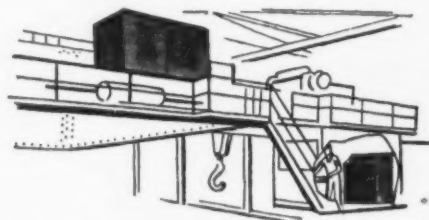
CRANE CAB COOLERS AND CONDITIONERS

No matter what radical temperature variations or atmospheric conditions occur in your industry, there's a Dravo Crane Cab Cooler or Conditioner available to protect your crane cab operator, safeguard his health, increase his efficiency and alertness and improve safety and production records in your operations.

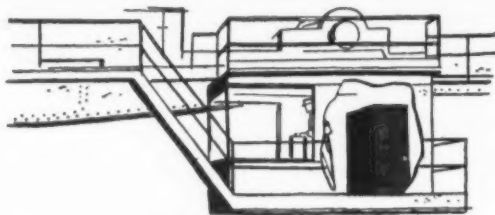
Dravo Crane Cab Coolers and Conditioners provide complete air conditioning, filter the air, remove dusts, dirt and fumes; heat the cab in winter, cool it in summer and provide constant ventilation the year around.



SELF-CONTAINED COOLERS—mounted alongside the cab or on the cab roof. Only electrical leads and connections required. Thermostat control—fully automatic—maintains 85° F. temperature with ambient temperatures up to 175° F. Ideal for "hot spots" in steel and other metal-working industries.



SPLIT-TYPE COOLERS—installed on the crane in two sections—the heavy condenser unit *on the crane* wherever you want it—the light cooling section *in the cab* with the operator. Two sections joined only with refrigerant pipe and electrical connections.



SMALL HEATERS AND VENTILATORS—especially designed to filter dusts and dirt, remove fumes, provide constant ventilation, supply heat in winter. Ideal for cranes in quarrying, slag, cement and similar industries.

One Source of Supply— Easy Installation

Dravo is your *one source of supply* for all crane cab coolers and conditioners. Units are quickly and easily installed with a minimum of downtime required. Parts are interchangeable on all units.

Available for Immediate Delivery

No delays in getting the units you want. For more information write for a complete catalog—or phone your nearest Dravo sales office and have our representative call on you.



DRAVO

C O R P O R A T I O N

605 Dravo Building, Fifth and Liberty Avenues, Pittsburgh 22, Pa.

ATLANTA • BOSTON • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH

Behind The

**J&L
STEEL**

Trade Mark



photograph by d'Arazien

Carbon content "to order"!

CHEMISTS at J&L use this high-temperature electric furnace in making sure that each heat of steel contains the amount of carbon specified on the customer's order.

Carbon is the principal element that makes steel different from iron, and is the chief hardening and strengthening element in the metal. More carbon (up to 1 per cent) forms hard steels. Less carbon (as little as .05 per cent) makes steel soft and workable.

Samples analyzed in this laboratory are taken from molten steel in the furnace, from the ladle while the steel is being poured into ingot molds, and from billets and bars after the steel is rolled. The samples are cooled and rushed to the laboratory through pneumatic tubes.

Drillings from the steel samples are weighed and placed in the oxygen atmosphere inside the small electric furnace

where the temperature is 2100 degrees F. Oxygen is passed through the combustion tube and combines with the carbon as it burns out of the steel, forming the gas CO_2 (carbon dioxide). The CO_2 is discharged into a pre-weighed absorption bulb. Change in weight of the absorption bulb is measured on the precision balance at the right, enabling the chemist to determine the percentage of carbon that was in the steel sample.

Steel with carbon (and the other important elements) "to order" for a specific application—that's the way your order is handled at J&L.

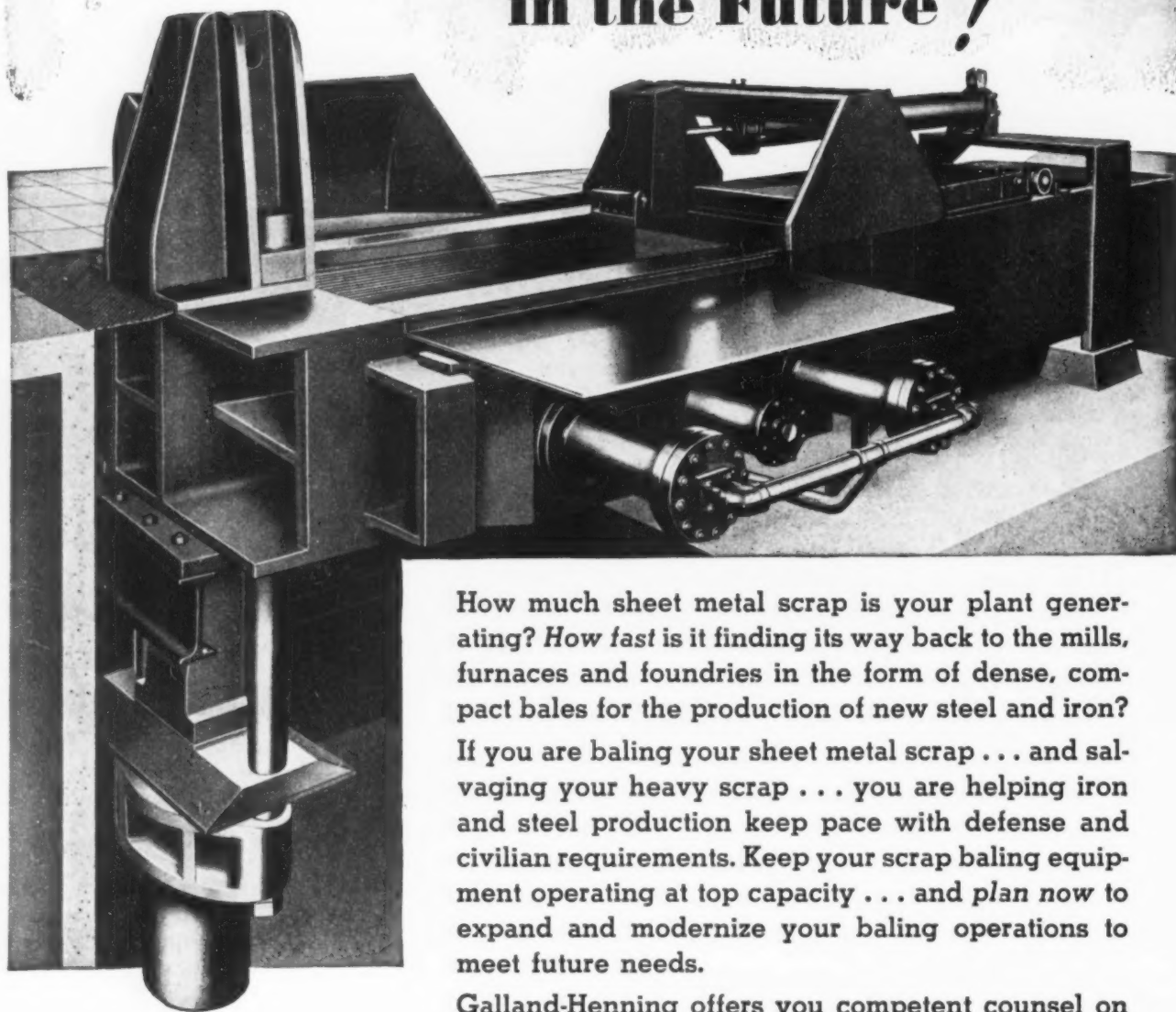
The never-ending, round-the-clock vigilance in Jones & Laughlin Steel Corporation laboratories is one of the many activities going on behind the J&L trademark to make better steel for your every use.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

More

BALED Scrap

**Means More Iron and
Steel for You...NOW and
in the Future!**



**GALLAND-HENNING
MANUFACTURING CO.**

2747 S. 31st ST., MILWAUKEE 46, WIS.

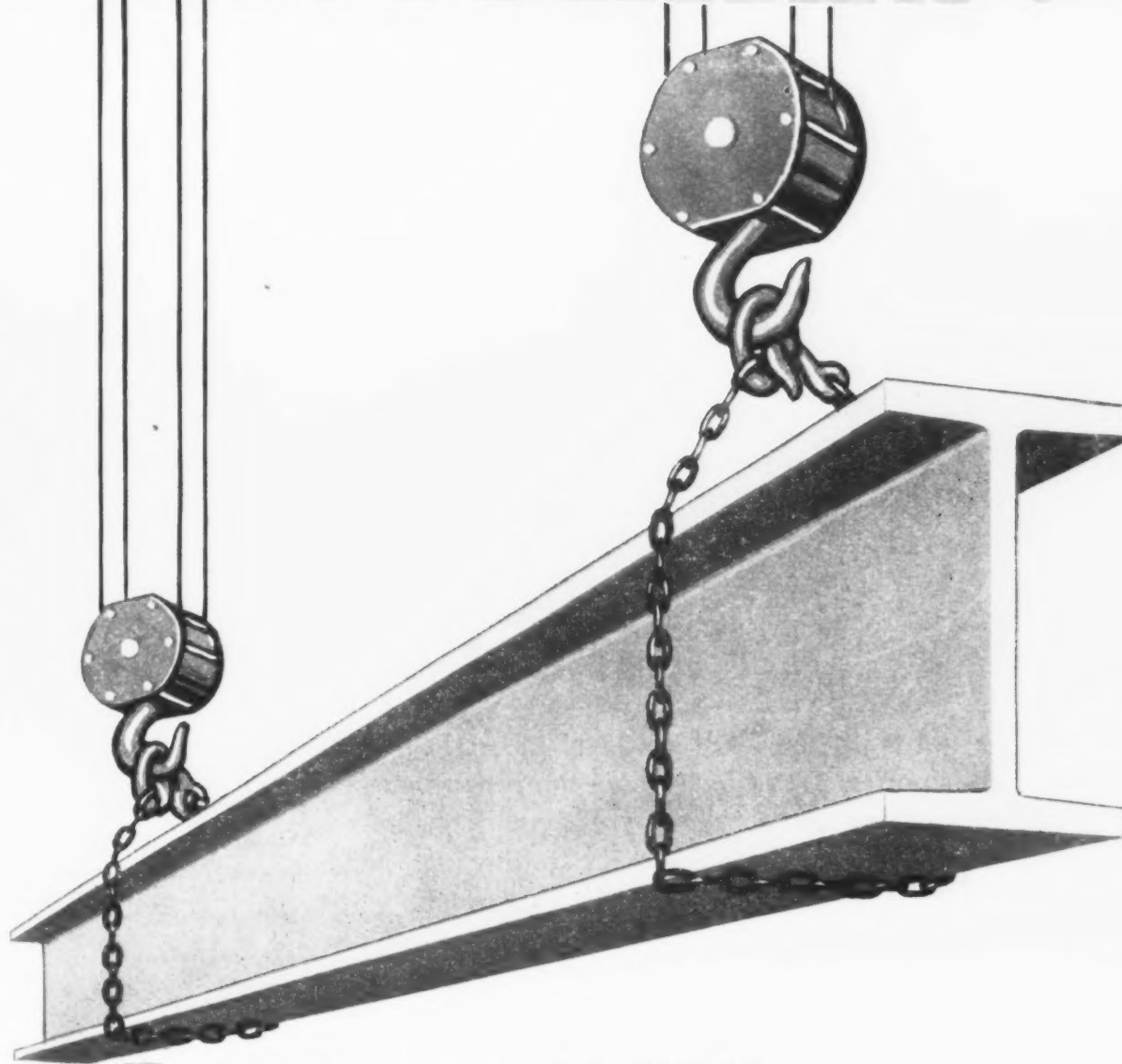
How much sheet metal scrap is your plant generating? *How fast* is it finding its way back to the mills, furnaces and foundries in the form of dense, compact bales for the production of new steel and iron? If you are baling your sheet metal scrap . . . and salvaging your heavy scrap . . . you are helping iron and steel production keep pace with defense and civilian requirements. Keep your scrap baling equipment operating at top capacity . . . and *plan now* to expand and modernize your baling operations to meet future needs.

Galland-Henning offers you competent counsel on your baling problems, based on years of experience in the design, construction and installation of powerful, hydraulic scrap metal balers for steel mills, industrial plants and scrap yards.

GALLAND-HENNING

SCRAP METAL BALING PRESSES

STRUCTURALS . . .



AS CLOSE

AS YOUR TELEPHONE



Hot Rolled • Cold Finished
Carbon & Alloy • Stainless
Copper • Brass • Aluminum
Expanded Metal • Structurals

Central Steel & Wire Company

CHICAGO 80, ILL.
P. O. Box 5310-A
REpublic 7-3000

DETROIT 12, MICH.
13400 Mt. Elliott Ave.
TWinbrook 2-3200

CINCINNATI 14, OHIO
Box 148 Annex Sta.
AVon 2230

MILWAUKEE 14, WIS.
6623 W. Mitchell St.
EVergreen 4-7400

a BIRD



in the HAND...

● ● ● A TUBE OF KNOWN QUALITY is the all-important factor in reaching top production peaks. Penn tubing has held the title of 'constant quality' for over a quarter of a century. Carefully inspected to detect any flaws or impurities which might hinder production or cause rejections, Penn tubing nets greater output and gains a point for your side.

You can depend on Penn for *first* quality—for installations that are right the *first* time. Take advantage of Penn's knowledge and experience in helping you choose the right type of tubing for your needs.

Write for new specification literature and send along your tubing problems—Penn is always ready to serve. You need *first quality tubing* to make production soar—you need PENN.

ADDRESS CORRESPONDENCE
TO "DEPT. 1A-10"

QUALITY TUBING HAS A "PENN NAME"



PENN BRASS & COPPER COMPANY

ERIE • PENNSYLVANIA • TELEPHONE 3-1164

Lodge & Shipley 60" **T*** lathes



in 6 distinctive models

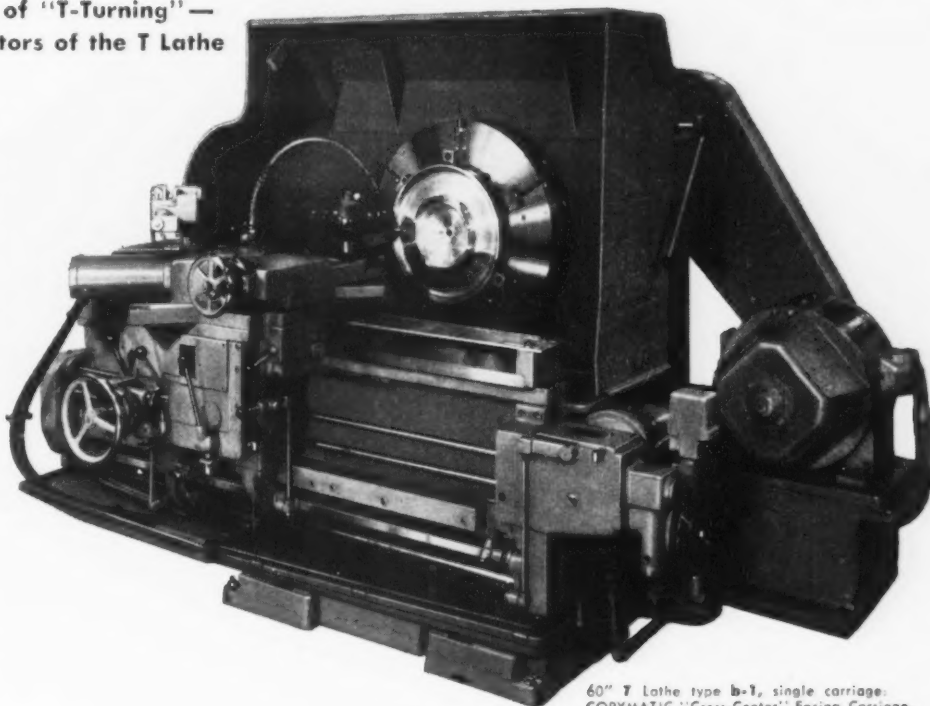
Further advances in the art of "T-Turning" — brought to you by the originators of the T Lathe

Developed as a result of the experiences and needs of jet engine manufacturers and others, these latest type Lodge & Shipley T Lathes offer even greater speed, accuracy and ease of machining.

These lathes have one or two carriages, either or both of which may be COPYMATIC controlled for automatic contour turning, facing and boring of short, thin-walled section work of large diameter. The new carriage arrangements further advance the art of "T-Turning."

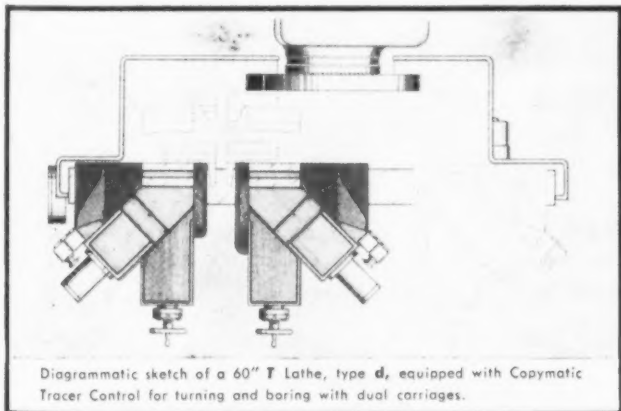
Basically, the T Lathe costs less than conventional machines, saves 50% or more in floor space, obsoletes the use of large cumbersome engine and raised lathes for this type of work.

Write for complete information and new T Lathe literature.



60" T Lathe type b-1, single carriage; COPYMATIC "Cross-Center" Facing Carriage.

Choose a Lodge & Shipley **T** Lathe designed for short, thin wall large diameter work



Diagrammatic sketch of a 60" T Lathe, type d, equipped with Copymatic Tracer Control for turning and boring with dual carriages.

THE **Lodge & Shipley**
COMPANY

MACHINE TOOL DIVISION • 3061 COLERAIN
CHOREMASTER DIVISION • 800 EVANS ST.
CINCINNATI 25, OHIO

*T. M. The Lodge & Shipley Co.

Type **a-l** for straight and angular facing, turning, boring

Type **b-l** for contour facing on both sides of center . . . limited contour turning and boring

Type **d** for contour turning, boring; straight facing and limited contour facing

Type **e** for contour turning; straight and angular facing, turning, boring

Type **i** for straight and angular facing, turning, boring

Type **n** for straight and angular facing, turning, boring and contour boring

TroubleSAVING!



with **854** sizes of . . . ready made bearings for machine tools and industrial machinery.

with **324** sizes of . . . completely finished bearings for electric motors of all sizes and makes.

with **263** sizes of . . . tubular and solid Bronze Bars completely machined on all surfaces.



Bunting Ads win 1st award in contest sponsored by Industrial Distributors Associations.

Bunting Standard Stock Bearings, Electric Motor Bearings and Precision Bronze Bars offer the quickest, simplest and most economical solution to your bearing problems in production and maintenance.

Bunting®

BRONZE BEARINGS • PRECISION BRONZE BARS • BUSHINGS

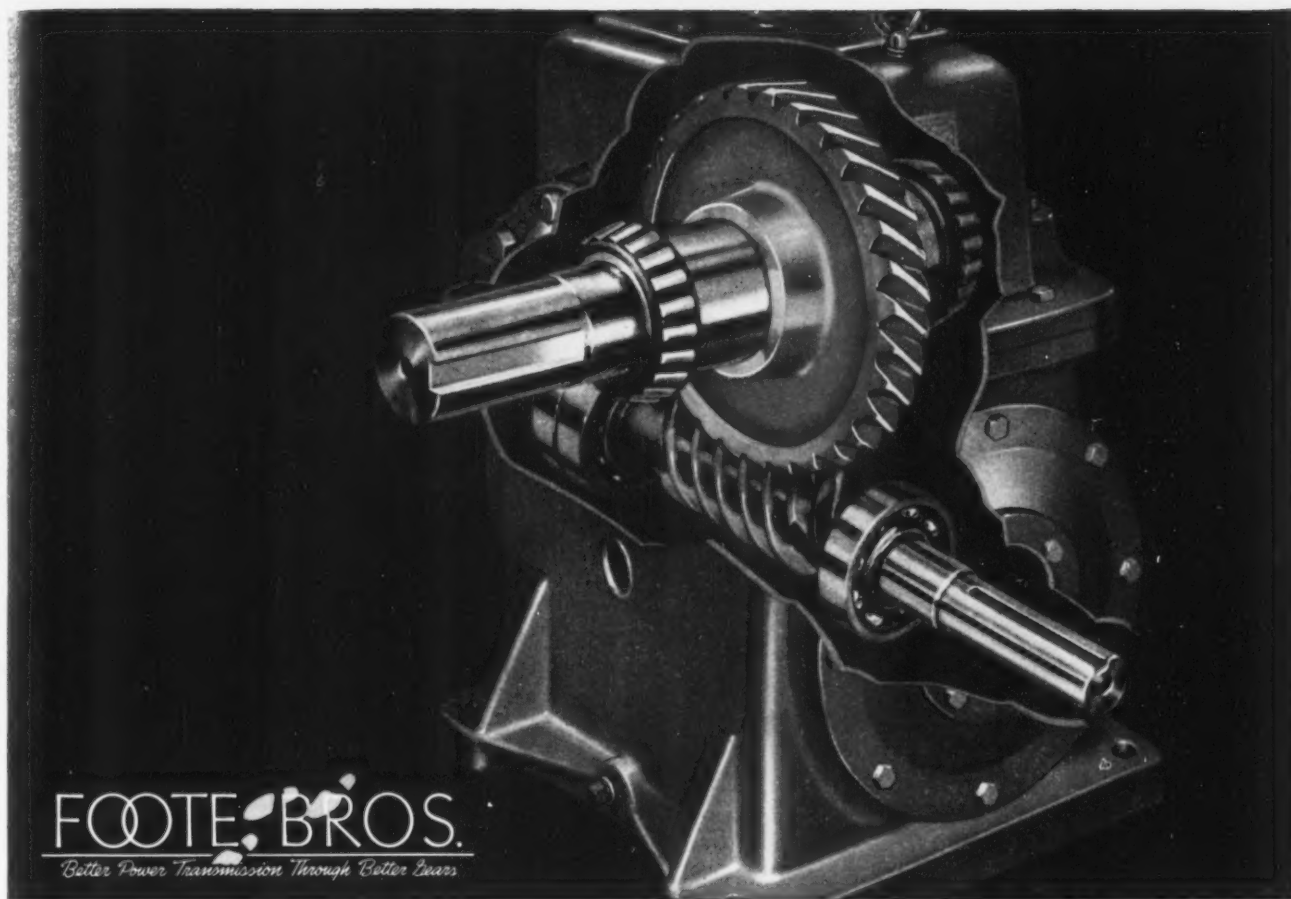


...IN STOCK EVERYWHERE

Bunting products are instantly available in all markets, from the stocks of leading industrial distributors and distributors of specialized industrial items. Ask your distributor or write for catalog.



THE BUNTING BRASS & BRONZE COMPANY • TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES



a matter of confidence

Specialists who designed this speed reducer entrusted production of its bronze worm gear blank to other specialists.

Foote Bros. Gear and Machine Corporation, Chicago, leading producers of Speed Reducers, Gears, and other quality Power Transmission Components for practically any industrial requirement, identify themselves with the phrase "BETTER POWER TRANSMISSION THROUGH BETTER GEARS."

For over twelve years, Foote Bros. have purchased thousands of 1/2 pound to 1500 pound non-ferrous gear blanks from National Bearing Division—confidently entrusting their reputation and industry leadership to special foundry skills for which National Bearing is famous.

And Foote Bros. confidence is well placed.

National Bearing's proven ability to mass produce exceptionally fine-grained, non-ferrous castings, free from blow holes and sand inclusions, can be depended upon under even

the most exacting engineering and manufacturing specifications.

As a typical customer service-plus, National Bearing Division's engineers and foundrymen recently designed, and produced for customers like Foote Bros., a bronze gear blank that contains even higher physical properties.

Through a new foundry technique, National Bearing imparts greater hardness, finer grain, and more tensile strength to the bronze gear blank ring, to a depth below where the teeth are cut. In addition, this new process gives such extra advantages as higher uniformity, closer tolerances, and economy of stock.

If your product requires special mass-produced non-ferrous castings or bearings, National Bearing Division has the foundry facilities, experience, and skill that will insure better product performance, and may possibly lower product costs through production-run economies. You are invited to write to National Bearing Division for complete information.

Brake Shoe

NATIONAL BEARING DIVISION

4923 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

October 9, 1952

107

The most economical mover of metals available



DINGS NEW LIFTING MAGNET

Improved these ways . . .

BIG IMPROVEMENTS LIKE: moisture-proof, shock resistant all welded construction • A finer insulating compound—vitally important because of its ability to dissipate strength-sapping heat • Four point chain suspension—another Dings exclusive—for less swinging and tipping, bigger loads and much better all around control • *Scientifically balanced magnetic circuit*—the crux of a great magnet—means all magnetic strength into the lift. Proof of this lies in the extremely low heat rise.

LITTLE IMPROVEMENTS LIKE: protector plate guards, waterproof, shatterproof, jerk resistant molded neoprene neck cable connectors, tamper-proof sealed terminal box and many, many others.

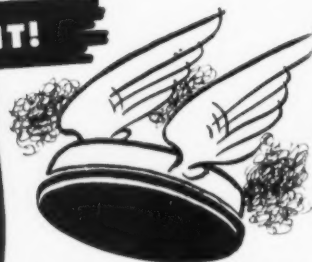
THEY ALL ADD UP TO: the new Dings lifting magnet—successfully designed for lighter weight, bigger payload and longer life.

DINGS MAGNETIC SEPARATOR COMPANY
4709 Electric Ave., Milwaukee 46, Wisc.

Dings Magnets

World's Largest Builder of Electric and Non-Electric Magnetic Separators for All Industry

LIGHT!



IN PROPORTION TO
LIFT!

**MOISTURE-
PROOF!**



IT'S
ALL WELDED

**A COOL
OPERATOR**



LOW HEAT RISE
MEANS MORE LIFT!

**TROUBLE-
FREE!**



A DOZEN NEW FEATURES
KEEP IT THAT WAY!

Get Details on Why This New Dings MOVES MORE, FASTER, AT LESS COST. Send Now for the Lifting Magnet Catalog.



Here are three "spots" where Farrel® can help you



ROLLING MILLS — For almost a century, Farrel mills have been helping to solve rolling mill production problems. They are built in a wide range of types and sizes for rolling nonferrous rods, strips or sheets, metal foils and cold strip steel. Farrel also designs and manufactures coilers and special handling equipment required to make each installation a complete production unit.

MILL DRIVES — Specially designed to suit individual requirements, Farrel reduction gear drives, pinion stands and combination units are built in any size for any capacity. Combination units have the reduction gears and pinions in a compact, integral housing.

ROLL GRINDERS — Available in two types and nine standard sizes, Farrel roll grinders enable you to fix and maintain definite standards of accuracy and finish. Rolls are produced with a flawless surface, free from marks of any kind, ground straight, or with concave or convex contours of exact symmetry and accuracy.

Information and engineering consultation available, without obligation.

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Pittsburgh, Chicago, Los Angeles, Houston



FARREL ROLLING MILL EQUIPMENT

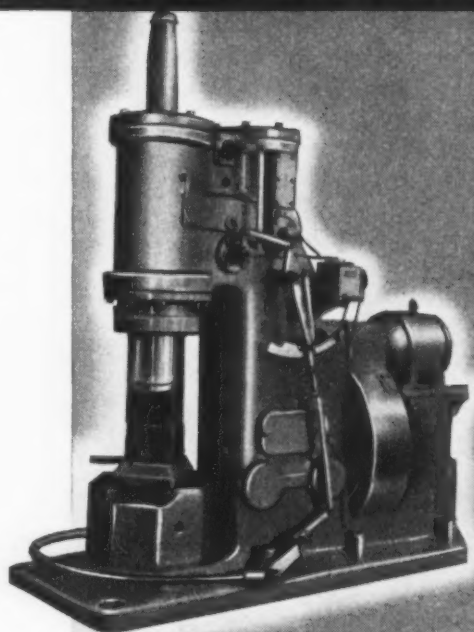
- | | |
|--|--------------------------------|
| Rolls | Mill Pinions |
| Rolling Mills | Pinion Stands |
| Mill Tables and
Manipulating
Equipment | Gear Drives of
Any Capacity |
| Universal Mill
Spindles | Flexible Couplings |
| Rod Coilers | Roll Grinding
Machines |
| Gears | Roll Calipers |

FB-762

NAZEL

ELECTRO-PNEUMATIC
FORGING HAMMERS

"Packaged"...



... BECAUSE THEY'RE ENTIRELY SELF-CONTAINED

Hammer, Air Compressor and Electric Motor are "all one"—therefore, the NAZEL requires no boilers, compressors, tanks, piping, fuel, ash handling, shafting, pulleys, hangers, etc.

The NAZEL Hammer can be started or stopped at the mere push of a button, and it uses power *only when working* (think what this means in comparison with other types of hammers).

Low upkeep cost and high efficiency are outstanding features of the NAZEL.

To meet Industry's varied Forging Requirements ... we produce the NAZEL Hammer in 5 different types and 16 sizes.

**"MORE USED
THAN ANY OTHER HAMMER
OF SIMILAR TYPE"**



1836

LOBDELL UNITED COMPANY
WILMINGTON 99, DELAWARE.
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

1952

NO LUDLOW FIRE HYDRANT HAS EVER FAILED IN LINE OF DUTY!



Everdur stems resist stresses, strains and corrosive attack

Everdur* has helped to endow many types of products with the same time-tested reliability of performance of which the makers of these Ludlow Fire Hydrants are so justifiably proud.

Everdur,* The American Brass Company's group of Copper-Silicon Alloys, has long demonstrated its ability to resist corrosion while at the same time providing strength, toughness and unusual fatigue resistance plus easy workability and weldability.

It provides many of the properties required for tin-bronze application.

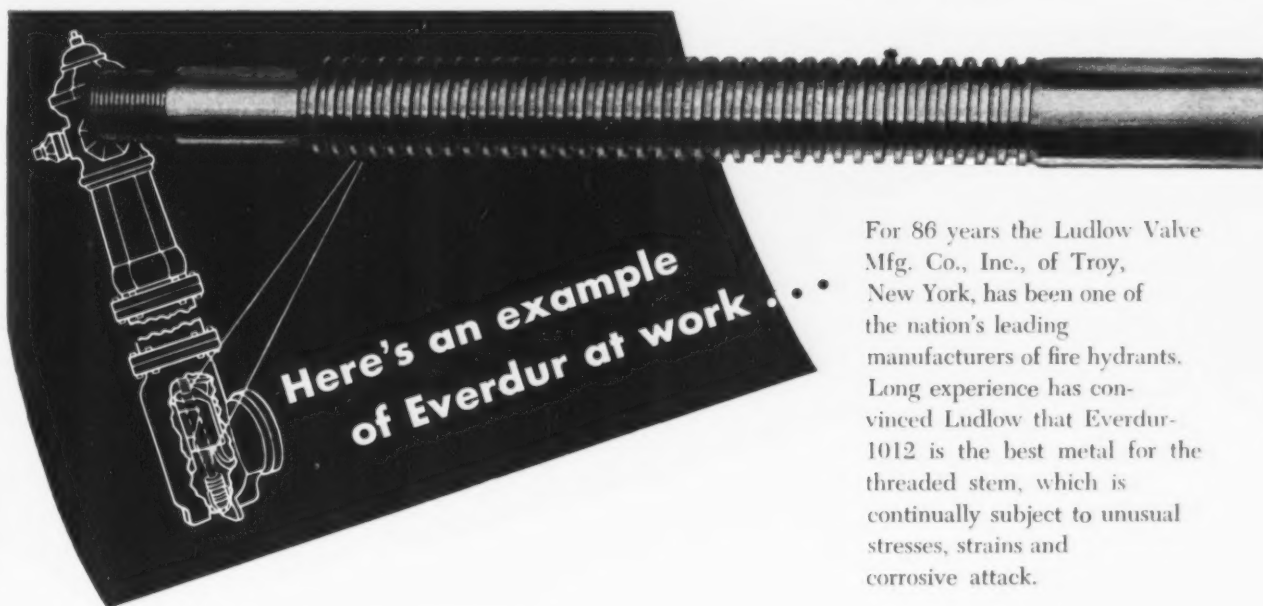
Tell us what you make — and how it is to be used. We'll do our best to help you get the right metal. It may be Everdur or one of a dozen different ANACONDA Alloys. Address The American Brass Company, General Offices, Waterbury 20, Connecticut.

*Reg. U. S. Pat. Off. 5280

EVERDUR is produced in nearly all commercial forms including casting ingots for remelting. It offers:

*High Strength and Toughness
Unusual Fatigue Resistance
Excellent Corrosion Resistance
Weldability plus Workability
Machinability*

Publication E-5 gives Applications, Physical Properties and Constants of Everdur. Publication E-1, on Everdur Casting Ingots, describes Foundry Practice and Procedure. Write for either or both.



The Everdur-1012 (free-cutting alloy) stem, used in the Ludlow Hydrant, is 15" long with a 1-5/16" -4 square-cut thread.

For 86 years the Ludlow Valve Mfg. Co., Inc., of Troy, New York, has been one of the nation's leading manufacturers of fire hydrants. Long experience has convinced Ludlow that Everdur-1012 is the best metal for the threaded stem, which is continually subject to unusual stresses, strains and corrosive attack.

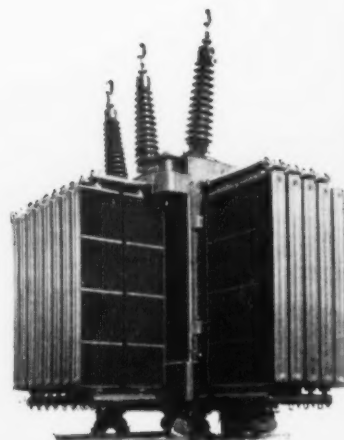
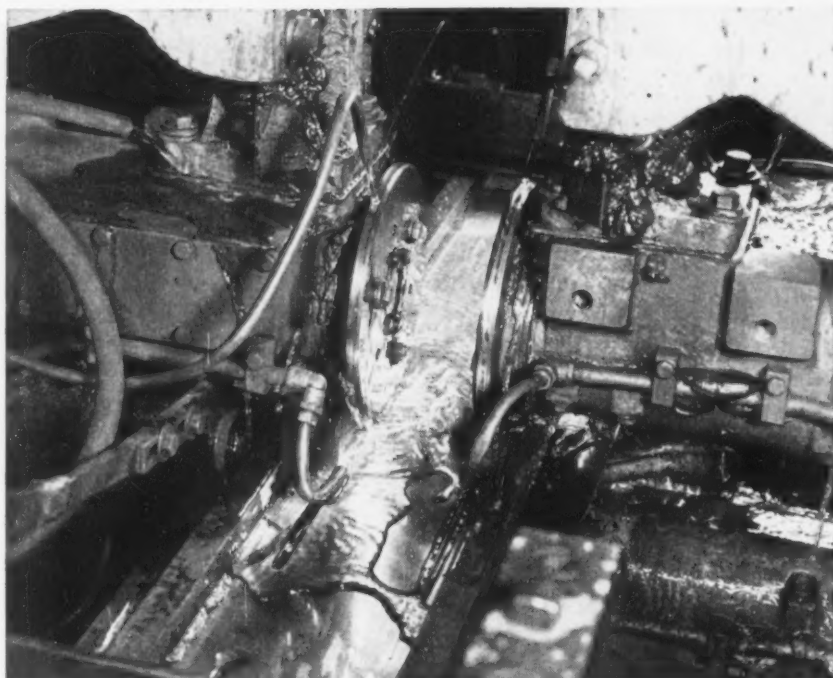
EVERDUR

ANACONDA

COPPER-SILICON ALLOYS

STRONG • WELDABLE • WORKABLE • CORROSION-RESISTANT

Look at this example of lowered production costs with **MALLORY 22** **Seam Welding Wheels**



Typical Westinghouse power transformer showing Mallory 22 seam welded radiators in place.

To fabricate steel radiators like those shown at right above, Westinghouse uses Mallory 22 seam welding wheels on this continuous resistance welding machine which welds two, mated, flat steel sheets.

LOOK TO MALLORY FOR ALL YOUR RESISTANCE WELDING NEEDS

For 25 years Mallory has pioneered a wide range of developments in the resistance welding field—including many widely used alloys and a wide range of electrodes and holders. They offer top performance at low cost. Call on Mallory whenever you need cast-copper base electrodes, holders, dies, castings, forgings, rods and bars for resistance welding applications.

In addition to a complete line of resistance welding products, Mallory offers unequalled engineering service.

Production costs dropped for Westinghouse when Mallory 22 seam welding wheels were put to work welding radiators for power transformers. Westinghouse finds Mallory 22 wheels last longer... require fewer dressings... cut set-up time... thus help speed production and lower costs.

Mallory 22 metal, a copper base alloy containing cadmium and zirconium, offers high strength, high conductivity, and high ductility at elevated temperatures. These characteristics give it great resistance to mushrooming and cracking—thus making it the ideal wheel material for mash seam welding or similar applications where the welding heat is high and where cooling of the wheel may be necessarily inefficient.

Whatever your needs for seam welding wheels may be, it will pay you to put Mallory's facilities and experience to work for you. Call or write Mallory today, or get in touch with your local Mallory distributor.

*In Canada, made and sold by Johnson Matthey and Mallory, Ltd.
110 Industry St., Toronto 15, Ontario*

P. R. MALLORY & CO. Inc.
MALLORY

SERVING INDUSTRY WITH THESE PRODUCTS:

Electromechanical—Resistors • Switches • Television Tuners • Vibrators
Electrochemical—Capacitors • Rectifiers • Mercury Dry Batteries
Metallurgical—Contacts • Special Metals and Ceramics • Welding Materials

P. R. MALLORY & CO., INC., INDIANAPOLIS 6, INDIANA

For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio.

WATSON-STILLMAN

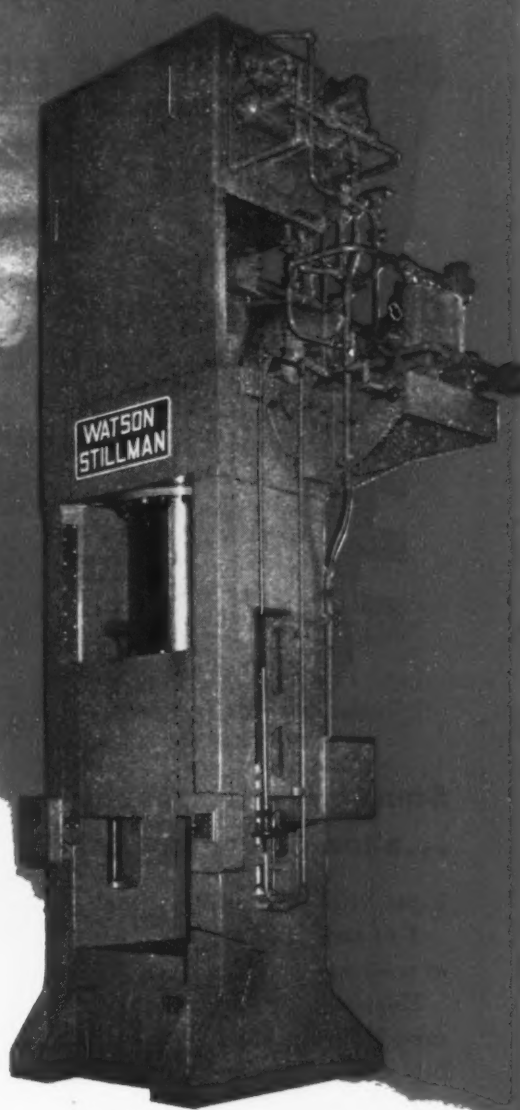
HYDRAULIC POWER *becomes* *Fire Power* QUICKLY... EFFICIENTLY... ECONOMICALLY

with **W-S ORDNANCE PRESSES**

W-S Hydraulic Press flexibility of control is a natural for the precision required in shell forging manufacture. Combine this control with the economy of using only the press tonnage and stroke required and the exactly suitable speed and you have the answer to every pressing operation.

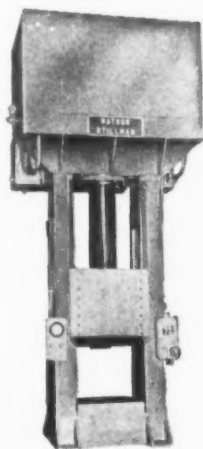
Reject percentage drops instantly, noise levels decrease, maintenance problems become insignificant when hydraulics take over your Ordnance press jobs. And hydraulics, of course, have been synonymous with Watson-Stillman for more than a century.

Write now specifying your type and size of shell for today's W-S Press recommendations . . . it's backed by 104 years of hydraulic experience.

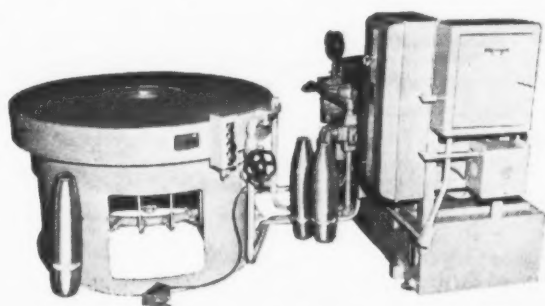


Cold Extrusion Press

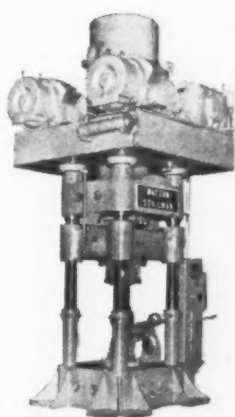
9-M-5



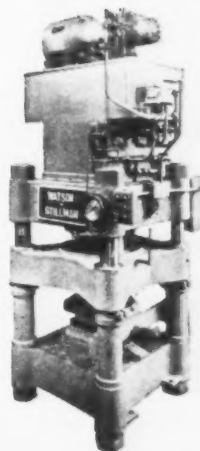
Shell Piercing Press



Shell Bander



Shell Nosing Press



Billet Breaker

Branch Office:
228 N. La Salle, Chicago, Ill.



Manufactured in Canada by
Canadian-Vickers, Ltd., Montreal

Factory and Main Office:
HYDRAULIC MACHINERY DIVISION

1440 Aldine Rd.

ROSELLE, NEW JERSEY

WATSON-STILLMAN

ESTABLISHED 1848

W-S "Complete Line" Hydraulics

The Shortest Distance From Production to Profits

For high-density scrap bales up to 60 an hour



Use Lindemann
heavy-duty "SI" Presses

Shearing effect of hinged lid increases capacity ...allows handling wide variety of scrap

If you're pressing bales weighing from 200 to 600 pounds...

You can handle bulky scrap—and compress it into high-density bales at rates up to one a minute—with Lindemann triple-action "SI" Presses.

Hoppers hold large quantities of scrap at a filling. Hydraulically powered hinged lid shears off overhang against patented serrated bars on box edges. Extra-high pressures are provided for pressing heavy materials into dense bales.

Patented bale ejection onto conveyor belt or elevator—no jamming of bales. Ruggedly built for rough usage in the yard. Adaptable to the needs of blast furnaces, electric furnaces, motor car body works, large metal-working plants and large scrap dealers' yards.

Press box sizes from 60" x 36" x 33½" to 100" x 60" x 39½".

LOOK INTO THESE OTHER LINDEMANN PRESSES, TOO!

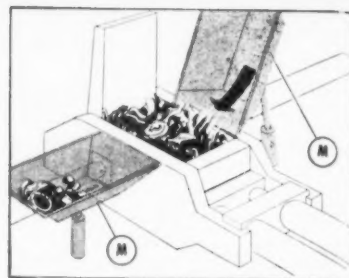
Other Lid-Type presses handle bales as small as 100 pounds—or as large as 8,800 pounds.

Patented Shearing Ram Presses combine functions of scrap shear and baling press—do away with prelimi-

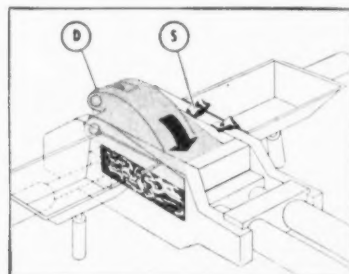
nary shearing or oxygen cutting.

Just tell us the business you're in—and amount and type of scrap you handle. We'll send you literature on Lindemann Presses that meet your needs.

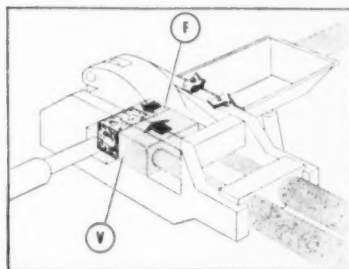
Replacement parts will be available at our Cleveland Service Center



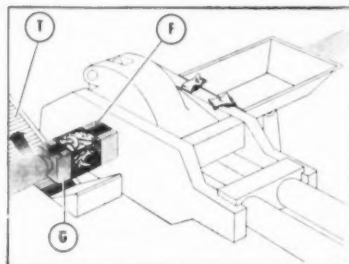
1. Scrap is fed by crane into either one or two hydraulically operated hoppers (M). Tilting motion of hoppers feeds scrap into press box.



2. Hydraulically-driven lid (D) enters press-box frame to exert first compression. Overhanging scrap (S) is cut off between edges of lid and serrated top of press box. Hoppers return to original position for refilling with scrap.



3. Half-pressure ram (V) closes to exert second compression. Final-pressure ram (F) closes for third compression that forms finished bale.



4. Final-pressure ram (F) and counter-pressure ram (G) eject bale directly onto conveyor belt (T), slide or elevator. Since hoppers have already been filled with scrap, machine is immediately ready for next pressing operation.

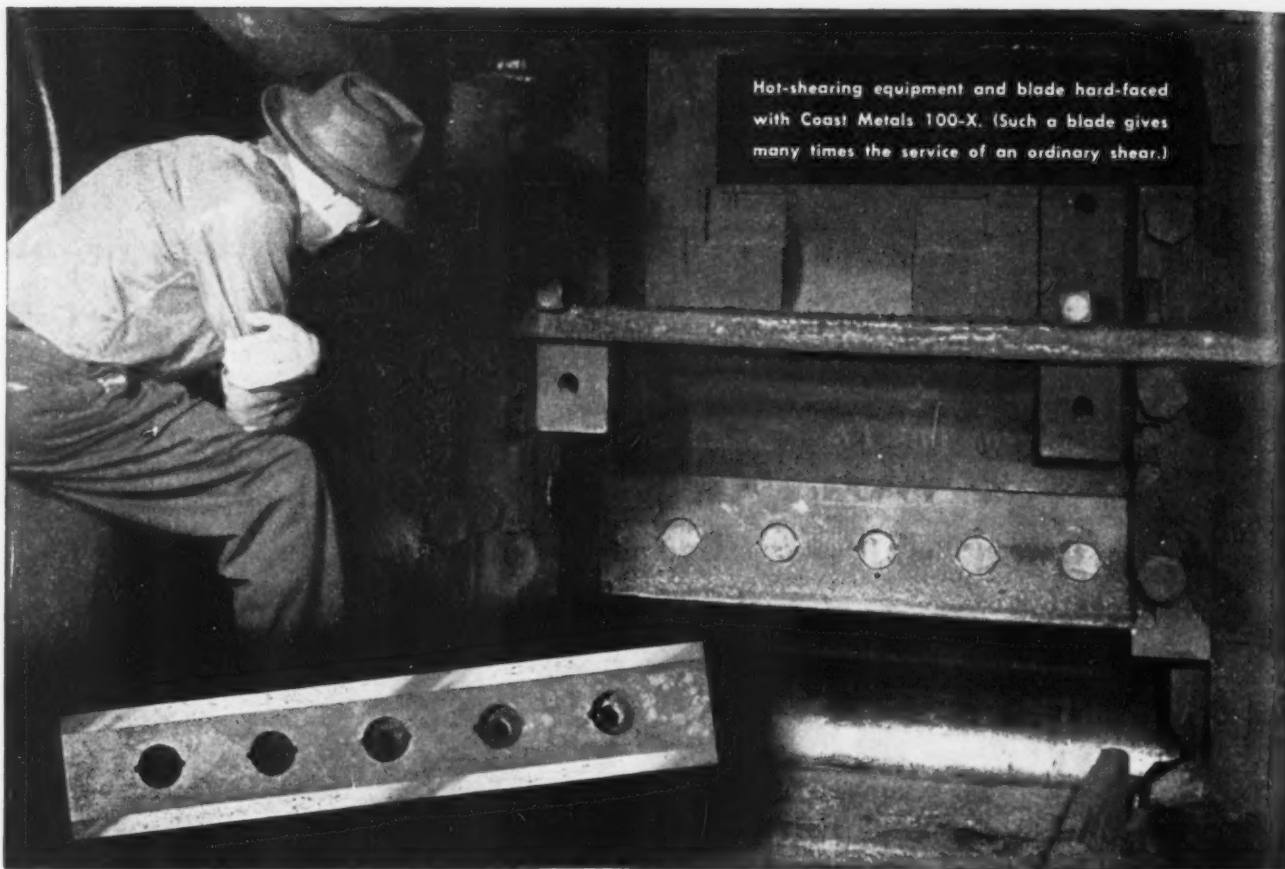
Keep scrap moving quickly, economically with Lindemann Baling Presses



KURT ORBAN

COMPANY, INC.

205 East 42nd St., New York 17 • 4220 Prospect Ave., Cleveland 3 • 19450 James Couzens Highway, Detroit 35



Hot-Shear Blades have a LIFE EXPECTANCY OF 300,000 TONS on Carbon Steel Slabs

Hard-facing with Coast Metals 100-X increases blade life 12 to 1

A typical performance record is being "chalked up" in a large Mid-west steel plant by hot-shear blades hard-faced with Coast Metals No. 100-X alloy.

Here are the details:

APPLICATION

Hot-shearing of carbon steel slabs—42" wide by 3", 4" and 5" thick—with set of 2 blades (top and bottom). No cooling employed.

BLADES

45½" x 9" x 3½". Base metal: S.A.E. 1040 carbon steel. Four edges of each blade hard-faced with Coast Metals 100-X rod.

PERFORMANCE

Top Blade—Continuous operation from May 4 to June 5, 1951 (32 days).
Tonnage (one edge): 84,695 tons.
Blade turned to second edge June 5.

Bottom Blade—Continuous operation from May 9 to June 5, 1951 (25 days).
Tonnage (one edge): 67,877 tons.
First edge still in use.

Experience has shown that all four edges of each blade will perform equally well. Thus a total life of approximately 300,000 tons *per blade* can be expected.

Die steel blades without hard-facing, previously used for identical work in the same plant, had a total tonnage life per blade of only 25,000 tons. Hard-facing with Coast Metals alloy 100-X, therefore, has increased

the life expectancy of such blades 12 to 1.

This is but one example of the way in which Coast Metals alloys are helping producers to increase the life of equipment and reduce downtime. In virtually every industrial field, parts which are subject to impact, abrasion and high heat during operation can be protected from wear—and made to give *much longer service*—by hard-surfacing with C. M. specialized weld rods.

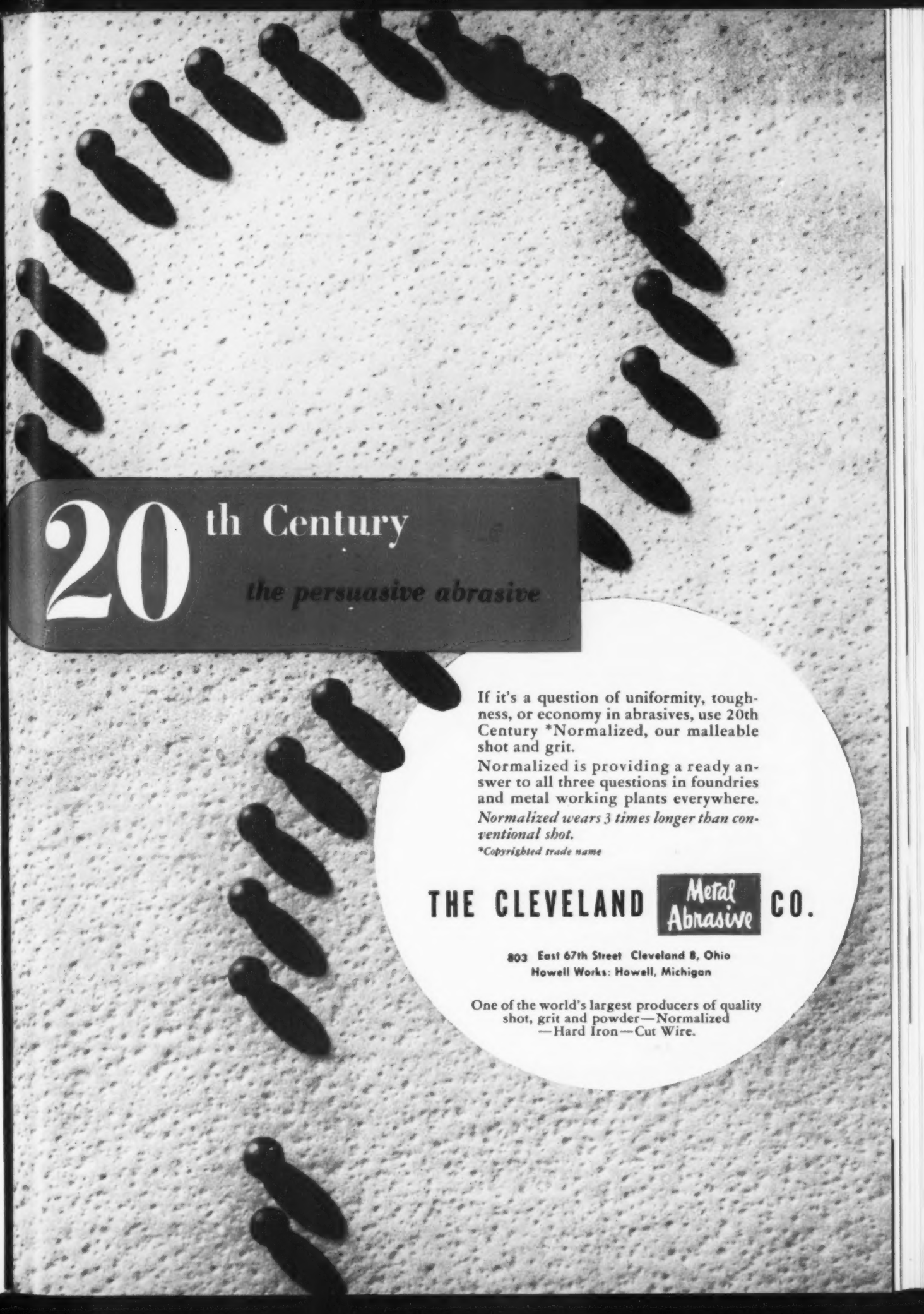
You can find no sounder way to economize than to realize the remarkable savings inherent in Coast Metals hard-facing. Why not let us know your requirements? We'll gladly make recommendations based on your particular needs.



COAST METALS, Inc.

Little Ferry, N. J.

PRODUCERS OF SPECIAL HARD-FACING ALLOYS FOR THE STEEL INDUSTRY



20th Century

the persuasive abrasive

If it's a question of uniformity, toughness, or economy in abrasives, use 20th Century *Normalized, our malleable shot and grit.

Normalized is providing a ready answer to all three questions in foundries and metal working plants everywhere. *Normalized wears 3 times longer than conventional shot.*

*Copyrighted trade name

THE CLEVELAND

Metal
Abrasive

CO.

803 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

One of the world's largest producers of quality
shot, grit and powder—Normalized
—Hard Iron—Cut Wire.

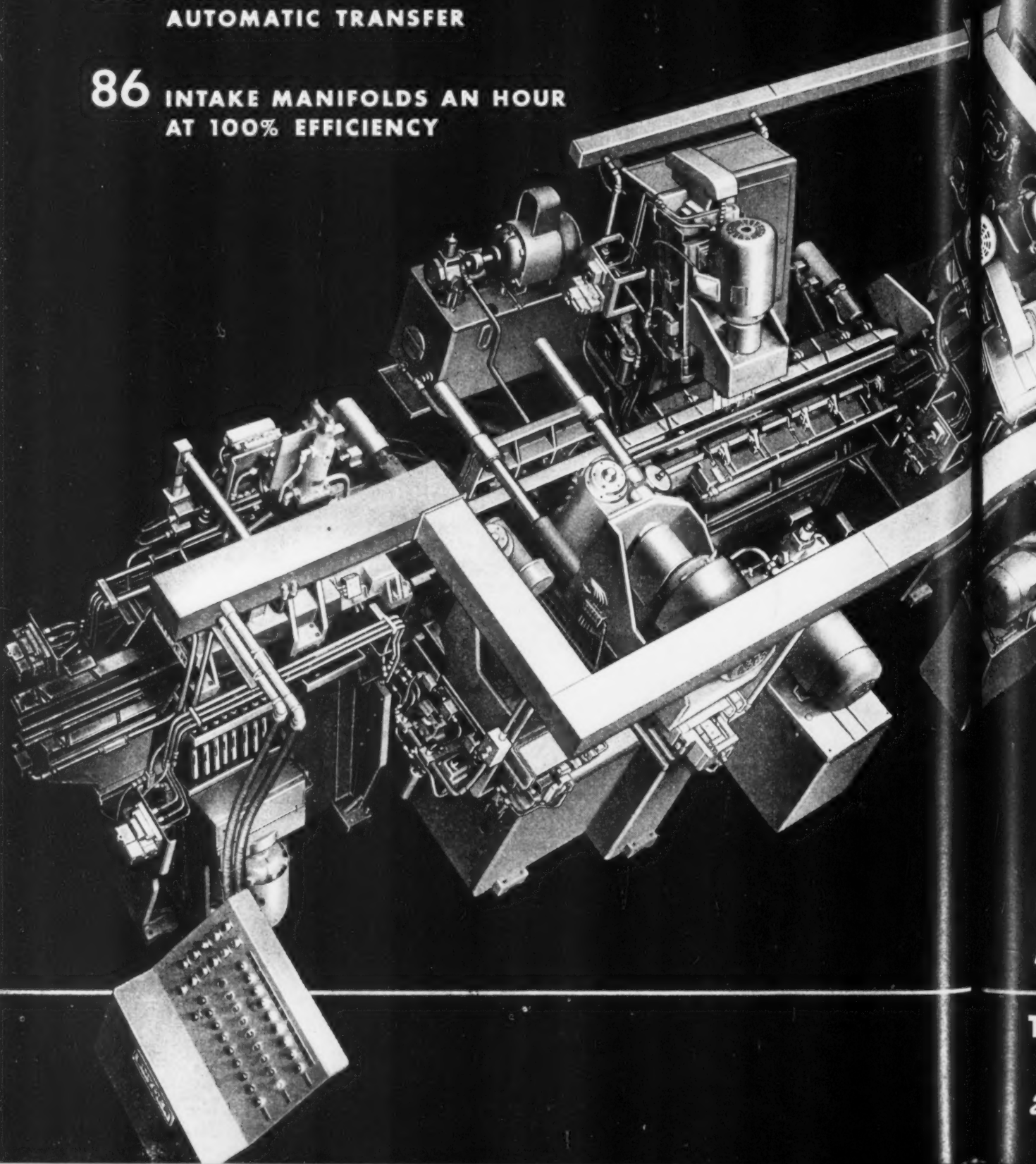
TRY

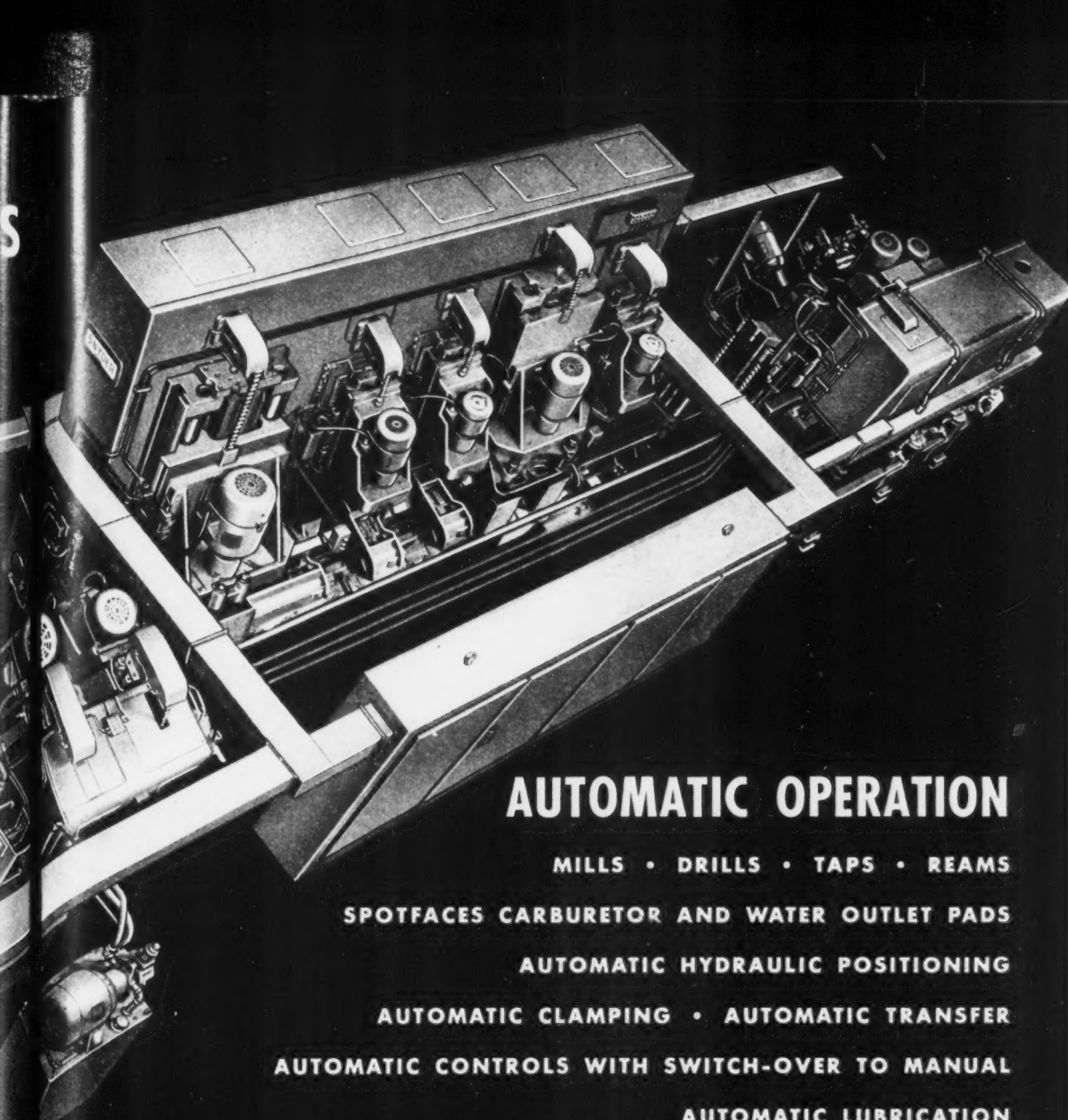
AGE

SNYDER MACHINES CONTROL COSTS

22 STATION
AUTOMATIC TRANSFER

86 INTAKE MANIFOLDS AN HOUR
AT 100% EFFICIENCY





AUTOMATIC OPERATION

MILLS • DRILLS • TAPS • REAMS

SPOTFACES CARBURETOR AND WATER OUTLET PADS

AUTOMATIC HYDRAULIC POSITIONING

AUTOMATIC CLAMPING • AUTOMATIC TRANSFER

AUTOMATIC CONTROLS WITH SWITCH-OVER TO MANUAL

AUTOMATIC LUBRICATION

AUTOMATIC SAFETY INTERLOCKING SYSTEM

SKILLED OPERATORS NOT NEEDED

SNYDER

TOOL & ENGINEERING COMPANY

**3400
E. LAFAYETTE**

★
**DETROIT 7,
MICHIGAN**

26 Years of Successful Cooperation with Leading American Industries



**PERFECTLY
MATED!**
Only Phillips
Drivers are per-
fectly mated to
Phillips Screws.
Look for the
name Phillips
on the shank.

Q. *How can they
increase your
sales?*

AMERICAN SCREW CO. • ATLANTIC SCREW WORKS, INC.
THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • THE EAGLE LOCK CO.
ELCO TOOL AND SCREW CORP. • GREAT LAKES SCREW CORP.
THE H. M. HARPER CO. • THE LAMSON & SESSIONS CO.
NATIONAL LOCK CO. • THE NATIONAL SCREW & MFG. CO.
PARKER-KALON CORP. • PHEOLL MFG. CO.
ROCKFORD SCREW PRODUCTS CO. • SCOVILL MFG. CO.
SHAKEPROOF INC. • SOUTHERN SCREW COMPANY
THE SOUTHTON HDWE. MFG. CO. • STERLING BOLT CO.
STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.

A. *Through the Phillips Cross-Recessed-Head Screws that they manufacture.* These famous fasteners are a mark of quality manufacture to your customers. Phillips Screws are nationally advertised in The SATURDAY EVENING POST as the clue to quality: X marks the spot. You'll find them a real sales-plus on your product. What's more, you save time, work, money with Phillips Wood, Machine, Tapping Screws or "Sems." They cut driving time up to 50%, set up tighter, add structural strength. With Phillips Screws you'll find production power driving practical, cut lost time due to accidents. Be sure to cash in on their many benefits.

X *marks the spot... the mark of extra quality*

PHILLIPS *Cross-Recessed-Head* **SCREWS**

As Advertised in



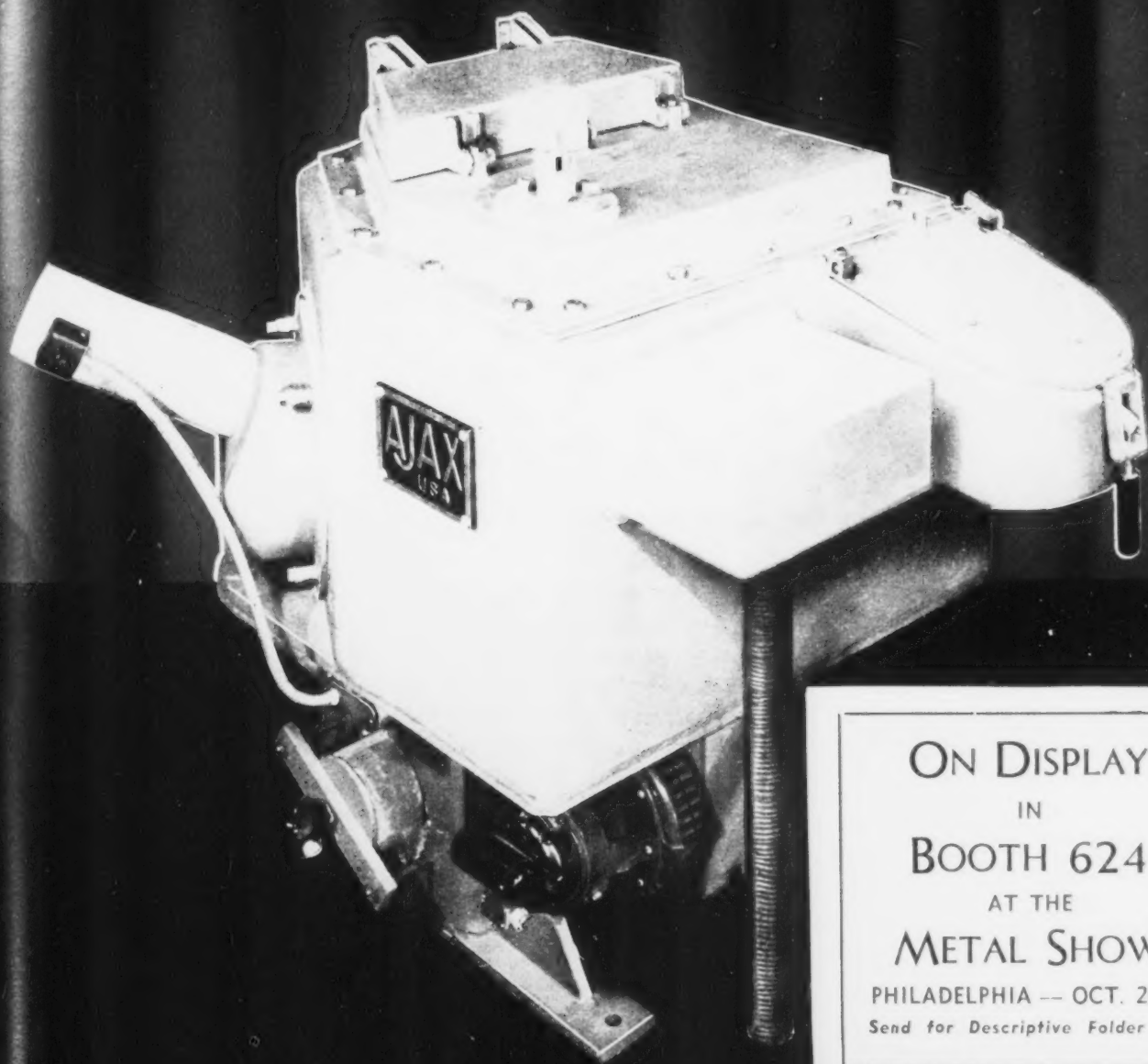
THE FASTENERS OF TODAY . . . AND OF THE FUTURE



AJAXOMATIC



AN AUTOMATIC POURING UNIT FOR THE
PRODUCTION OF ALUMINUM DIE CASTINGS



ON DISPLAY

IN

BOOTH 624

AT THE

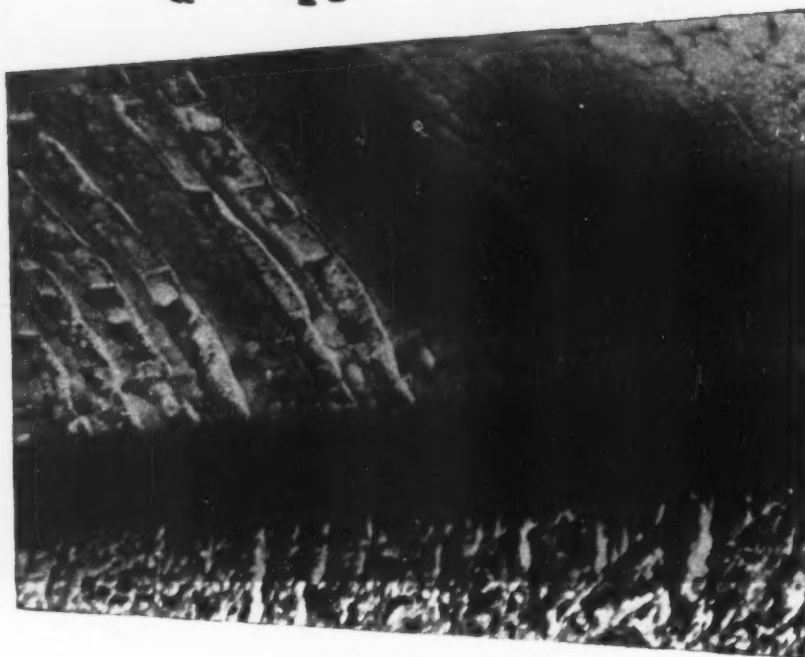
METAL SHOW

PHILADELPHIA — OCT. 20-24

Send for Descriptive Folder A-4

AJAX ENGINEERING CORPORATION

TRENTON, N. J.



Revolutionary

"ZEBRA ROOFS", built with alternate rings of silica brick and patented STEELKLAD-40 give top performance when open hearths are pushed for peak production. Unretouched photo shows marked superiority of ZEBRA section (on the left) over surrounding silica brick. Many operators report increased roof life despite higher tonnage. Others find reduced repairs to roof and backwalls. More and more plants are standardizing on ZEBRA roofs. Best results are obtained with 3" Silica Keys alternated with 3" or 6" of STEELKLAD-40.



A Complete Refractories Service

GREFCO BASIC BRICK For All Industry

The metallurgical industry demanded furnacelinings capable of withstanding extremely high temperatures under extraordinary operating conditions. To meet this challenge, Grefco research produced the famous RITEX unburned basic brick—one of the outstanding advances in the entire history of brick manufacture. RITEX brick possess great accuracy to specified dimensions. They are more resistant to thermal spalling ... offer lower porosity, lower thermal conductivity, and higher hot strength. These properties insure increased service at reduced cost.

STEELKLAD For Tough Duty

For service too tough even for RITEX, Grefco offers STEELKLAD, an unburned basic brick, permanently jacketed in a patented steel shell. The brick will not slide from its shell in the construction of a furnace wall. When the furnace is heated the steel oxidizes and is absorbed by the brick. It provides an exceptionally efficient monolithic lining that outlasts all other brick in basic open-hearth steel furnaces, electric-arc furnaces, soaking pits, copper smelting and refining furnaces, and other basic metallurgical furnaces.

Take A Look At STEELKLAD

Shown at the left is a typical STEELKLAD basic brick, steel-jacketed on the four major faces, and containing Grefco's unburned magnesite-chrome brick. The brick itself is exclusive and patented—as is the permanent steel shell. It may mean major savings in your operation.

Child's Play... made with brick!



● Skating down the sidewalk . . . thanks to bearings made with brick. Tiny steel bearings, little brothers to the precision-ground bearings that help move the wheels and shafts of American industry.

The production of steel for bearings—chemicals, glass, metals, for most everything else we use—depends largely on refractories to contain the high temperatures necessary in the furnaces of industry. Such products as Grefco silica brick, a favorite in electrical-steel and open-hearth furnaces, and in coke ovens.

General Refractories Company is one of the two largest producers of silica brick in the world.

Grefco silica brick are available in ever-increasing supply to meet the demands of American enterprise. And, like the thousands of other refractories products made by Grefco, they are the subject of constant research to assure their top quality.

If there's a smokestack in your business—call on the *complete refractories service* offered by Grefco.

GENERAL REFRACTORIES COMPANY

PHILADELPHIA



VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

Roll your own

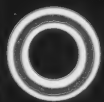
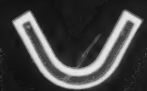
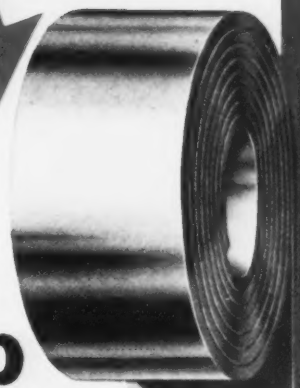
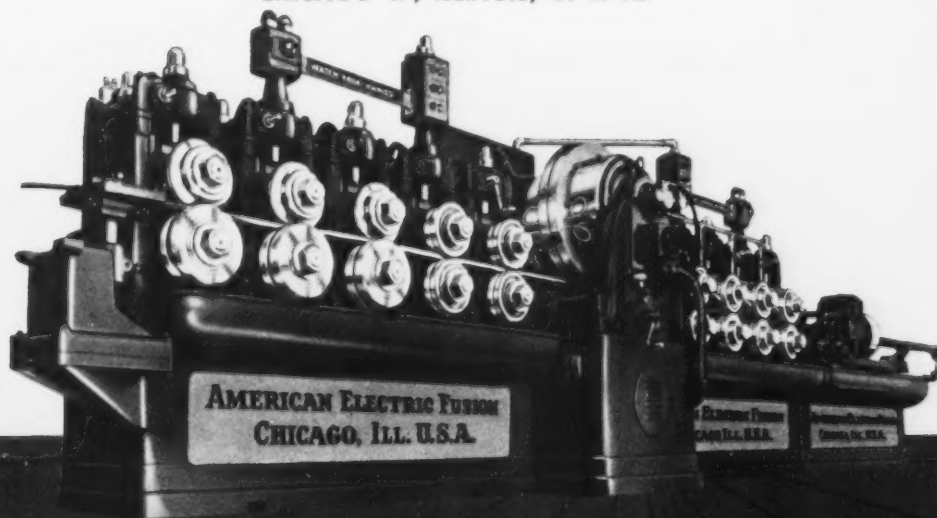
tubing from strip

In one continuous, automatic operation, the AEF Tube Mill converts steel strip into the finest welded tubing. Each mill is a compact, high-speed unit that will produce the highest grade tubing with a minimum of labor, over-head, and capital investment. Over 30 years of successful performance demonstrate that the economy of operation—at $\frac{1}{8}$ of one cent per each foot length of tubing—permits the return of the original investment in intervals ranging from 28 days to 6 months. It is impossible to purchase your pipe and tubing

requirements to compete with rolling your own on an AEF Tube Mill. Our engineers will plan your installation and give your operators training in operation and procedures. Write us giving the sizes and quantities of tubing needed and the uses for which it is intended. Tubing is guaranteed to be plus or minus .003" in diameter and concentricity. AEF Tube Mills are manufactured in three sizes, to produce pipe and tubing with wall thicknesses of .025" to .157" and outside diameters from $\frac{1}{2}$ " to $4\frac{1}{2}$ " O.D.

AMERICAN ELECTRIC FUSION CORPORATION

CHICAGO 47, ILLINOIS, U. S. A.



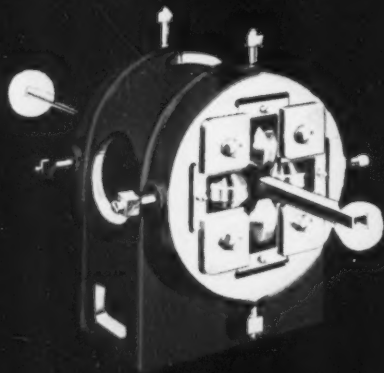
AMERICAN ELECTRIC FUSION CORP.

MANUFACTURERS OF ELECTRICAL WELDING EQUIPMENT

2600 DIVERSEY AVENUE

CHICAGO 47, ILLINOIS, U.S.A.

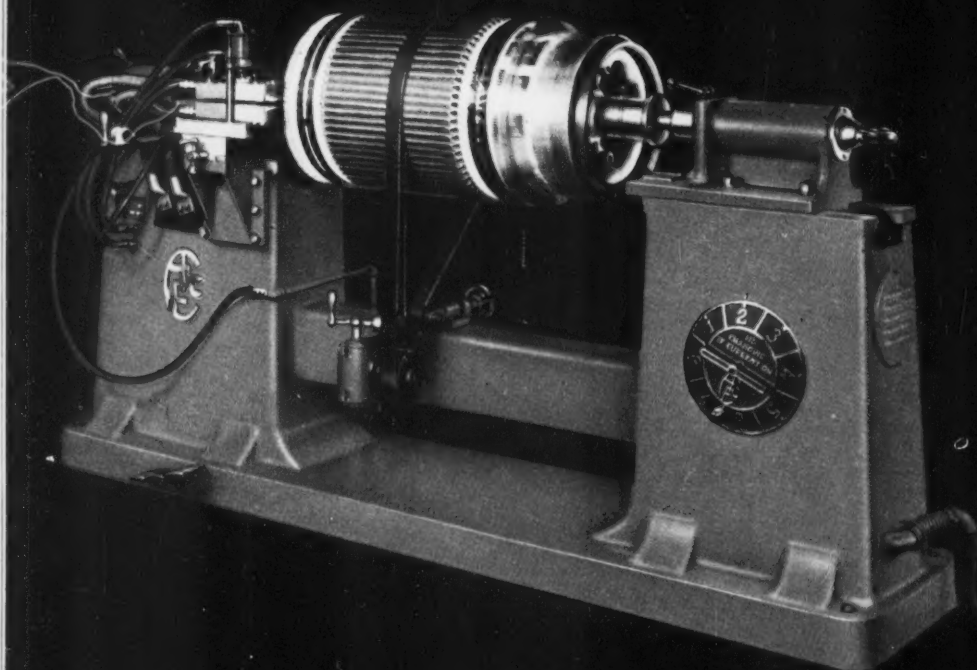
Round tubing produced by AEF Tube Mills can be formed into square, triangular, or other sections with the AEF Turks-head. Operates at Tube Mill speed. Specially formed tubing is cut by a special cutter, interchangeable with the standard AEF Cut-off Unit.



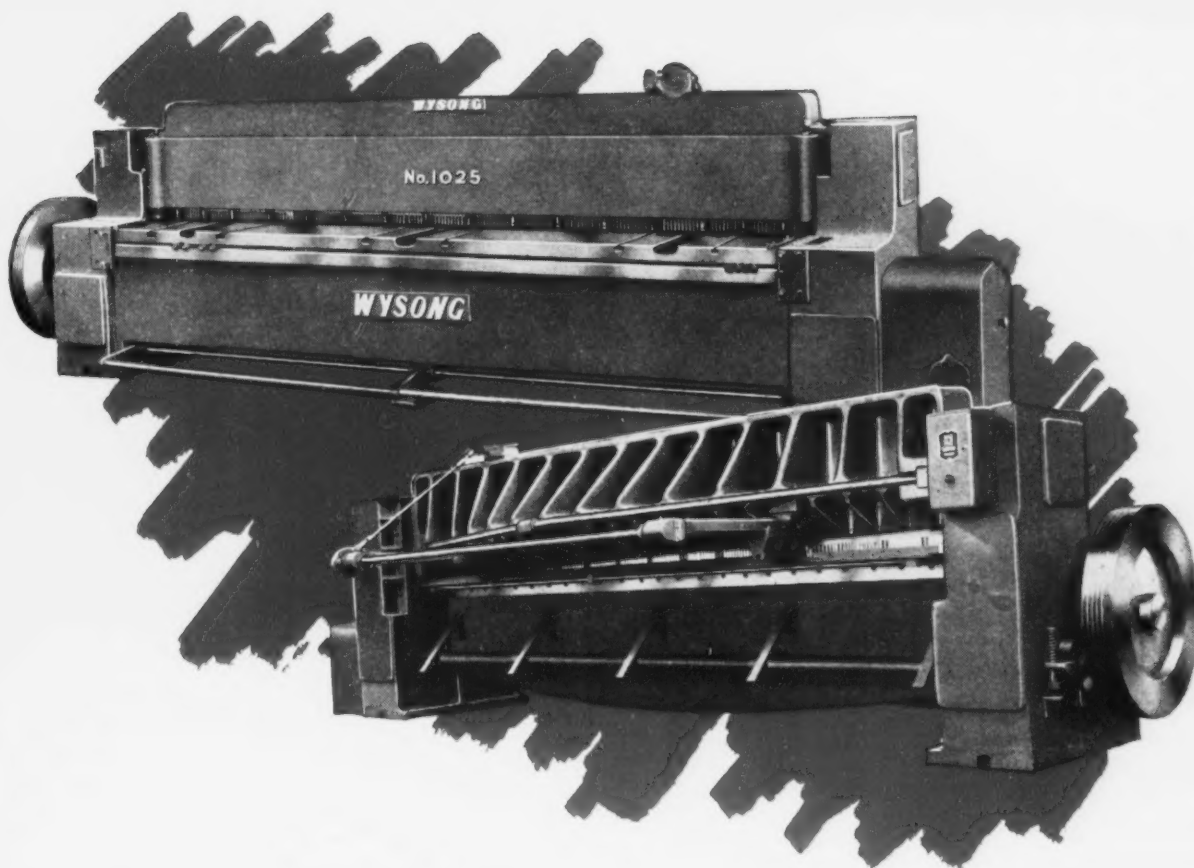
All AEF Spot Welders are designed to permit the maximum adjustment to meet specific individual requirements. They may be operated by manual foot pressure or by automatic air. Each Spot Welder is equipped with the patented "Kold-point" Electrode Cooling System. The "Koldpoint" increases efficiency and production speed and insures a low cost of operation. It lengthens the life of the welding tips, reduces time and expense of point dressing, and produces more uniform welding. AEF Spot Welders are manufactured in three mechanical size groups and in six transformer capacities.



• QUALITY • MACHINES •



The CBG - 24 Brazing Machine—developed originally by AEF for a leading Diesel locomotive manufacturer—is built for brazing and silver soldering coil ends of generator and motor armatures. Accommodates armatures of 18" to 42" in diameter and can be adapted with slight modification to any diameter requirements. The CBG-24 may also be used as a source of power supply for portable brazing equipment—and for other brazing and soldering applications.



WYSONG $\frac{1}{4}$ INCH PLATE SHEARS

No matter how you look at it you can see the massive, rigid construction of the WYSONG $\frac{1}{4}$ -inch series . . . made in 4, 6, 8, and 10 feet cutting lengths. Bed, end frames, and knife bar are one-piece Hi-tensile castings. Bearing surfaces between end frames and table, and gibbed ways for hold-down and knife bar travel are hand scraped for perfect fit and true squaring.

A clearly visible cutting line makes it easy to cut to a scribed line. Slotted metal finger guard, mounted on hold-down, protects fingers without obstructing view.

An automatic, mechanically operated *hold-down* provides powerful, positive hold down

action. The simplicity of the roller and cam action makes it sure and trouble free. Individual compression springs in each foot compensate for varying thicknesses in metal being sheared . . . Front operated, ball-bearing *back gauge*, adjustable to .0078 (1/128th) of an inch, is standard equipment. A *power operated back gauge*, in ranges of 24 and 36 inches can be furnished at extra cost . . . Powerful WYSONG *jaw-type clutch* has built-in non-repeat unit.

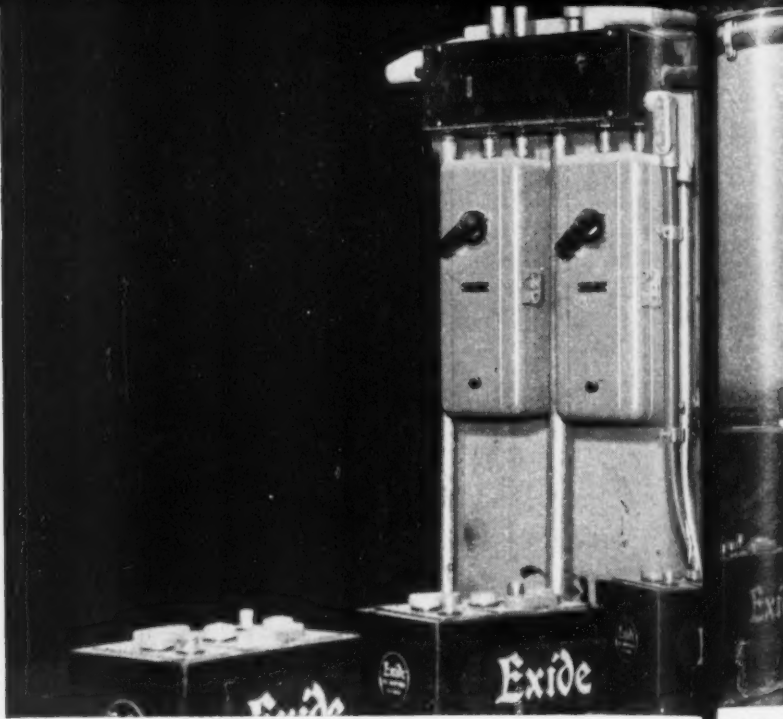
For performance . . . feature for feature and dollar for dollar, you can't beat the value of WYSONG squaring shears. Compare the WYSONG line with others in the field . . . and for shear satisfaction, buy WYSONG.

WYSONG builds Squaring Shears in cutting lengths from 3 feet through 12 feet, in motorized, air-power and foot-power models; O. B. I. Presses; Slip Roll Formers; and Rotary Combination Machines. See your dealer or write factory for full information.

Wysong and Miles Company, Greensboro, North Carolina

Illustrated above: Wysong No. 1025, Cap. 10 ft., $\frac{1}{4}$ in., mild steel

WYSONG



◀ **NICKELPLATE ROAD** has been modernizing their shop at Brewster, Ohio. One example: on an existing milling machine, left, a new G-E motor and a G-E full-voltage, combination magnetic motor starter assure top production. Their maintenance men say, "This G-E starter takes plenty of abuse and is easy to maintain."

Three more leading "G-E Magnetic

Nickelplate Road, The Electric Storage Battery Co. and Electro-Lift, Inc. have joined the thousands of companies who use G-E magnetic motor starters to maintain top production.

They know that dependable G-E starters give longer-lasting protection against shutdowns. Exclusive G-E features assure millions of starts and stops—even under tough conditions, varying loads.

LOW MAINTENANCE

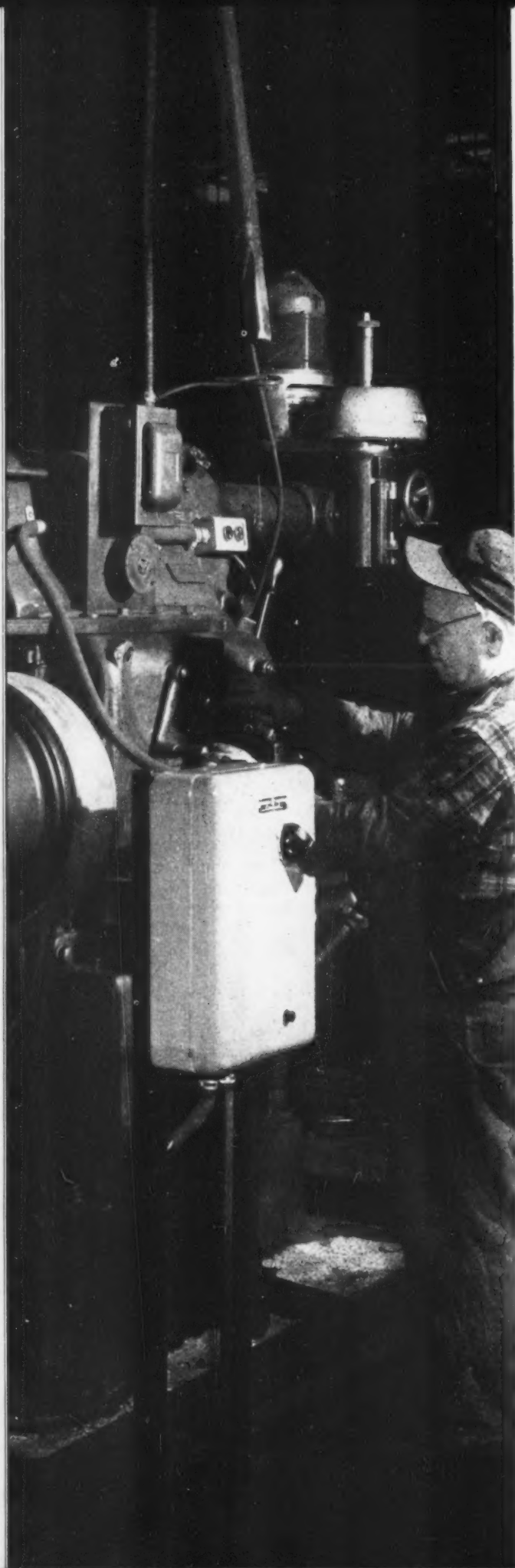
One big reason these companies chose G-E starters is low maintenance, year after year. The only tool needed is a screwdriver. Contacts are easy to inspect and remove—maybe interchanged without adding parts. Captive lockwashers, screws, and terminal clamps save time, make maintenance easier.

WIDEST VARIETY

General Electric manufactures the most complete line of motor starters. You have your choice of all NEMA sizes in general-purpose, watertight, dust-tight and explosion-proof enclosures. It's easy to add interlocks in G-E starters—change from normally-open to normally-closed—change coils.

FAST DELIVERY

You can get G-E starters right off the shelf by contacting your nearest G-E Apparatus Sales Office or authorized distributor. For more information send for bulletin GEA-5781. Address Section 730-40, General Electric Co., Schenectady 5, N. Y.



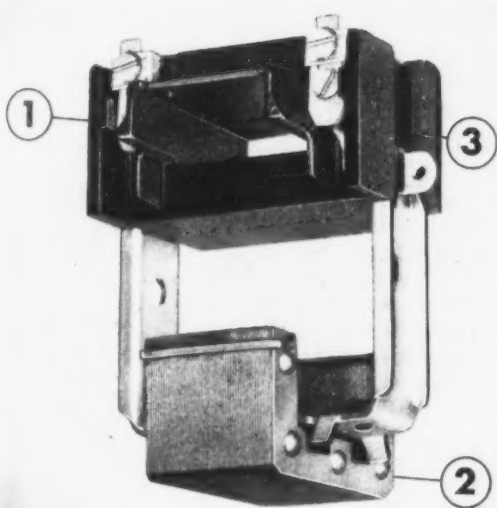


THE ELECTRIC STORAGE BATTERY CO. of Philadelphia, Pa. makers of Exide Batteries, chose General Electric magnetic starters to protect production flow. They report no shut-downs due to starter failure. Above, two G-E fusible combination starters are used in key section of an Exide production line.

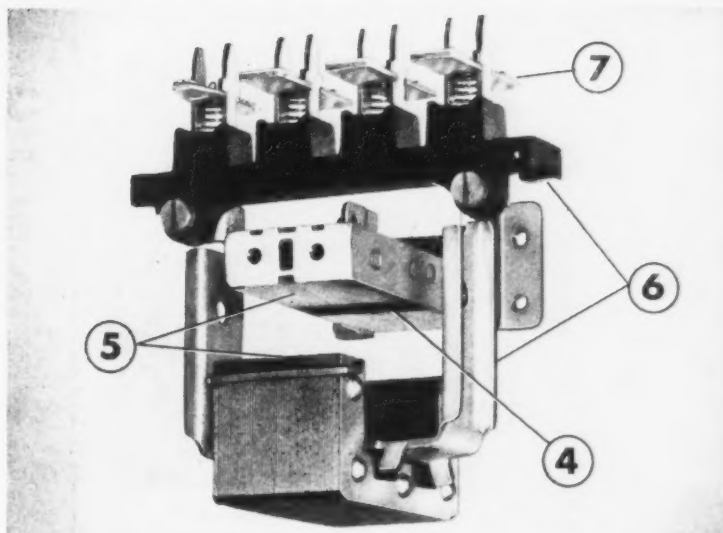


ELECTRO-LIFT, INC. of Bloomfield, N. J. makes motorized hoists which are subject to continual start-stop operation. They use G-E magnetic starters to assure unfailing operation to their customers, and to speed their own production. Ample wiring room and large pan-head screws, all in front, mean fast, easy installation.

Industrial plants report: "Starters keep production up!"



LONG LIFE is built right into the heart of G-E starters: the tough G-E *strongbox* coil (1). Winding is sealed in solid, molded plastic; dust, oil, moisture sealed out. This coil cannot be damaged by a maintenance man's screwdriver. Movable magnet of silicon steel (2) moves in straight line in permanently lubricated guides (3).

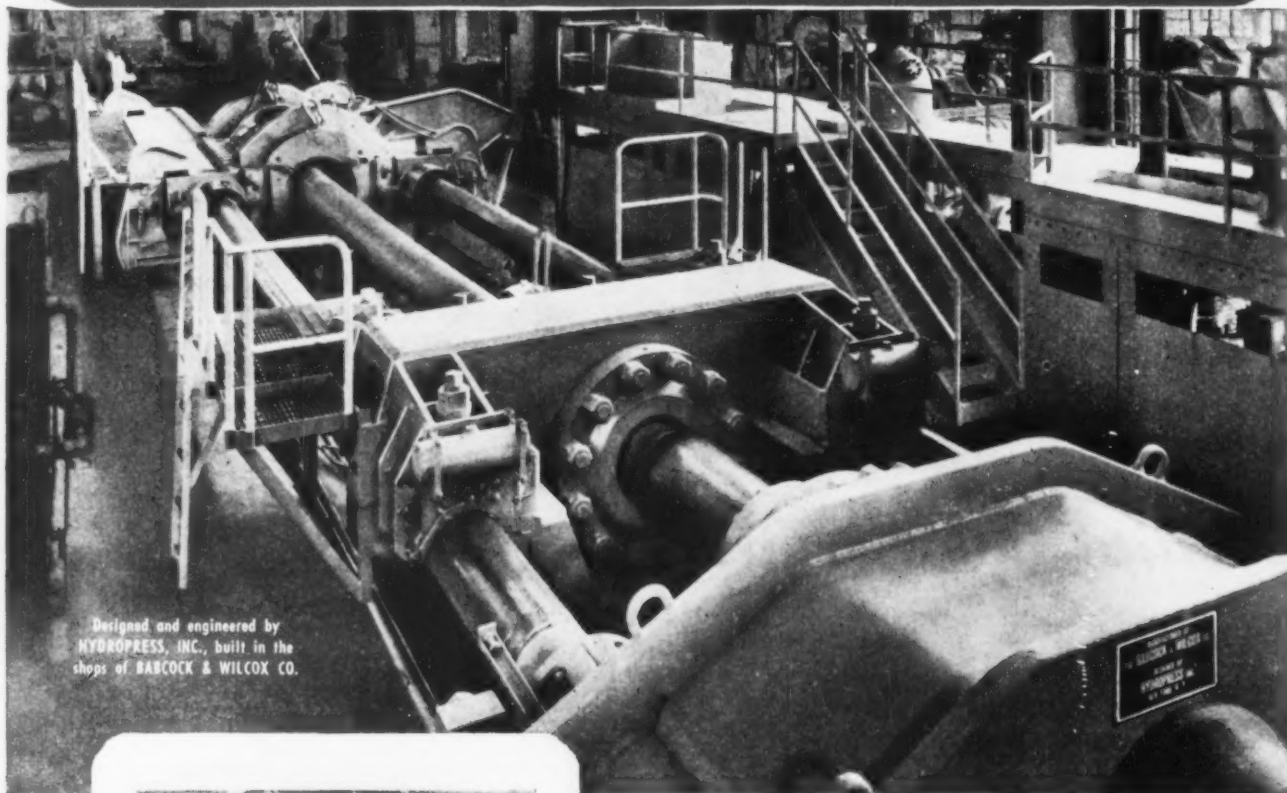


DEPENDABILITY is further assured by strong, simple construction. Magnets cannot stick shut because G-E starters have a *permanent* air gap (4) in stationary magnet. Gap never wears out—it is independent of striking surfaces (5). Unit construction (6) means no bearing pins. Note block of fine silver on contact tips (7).

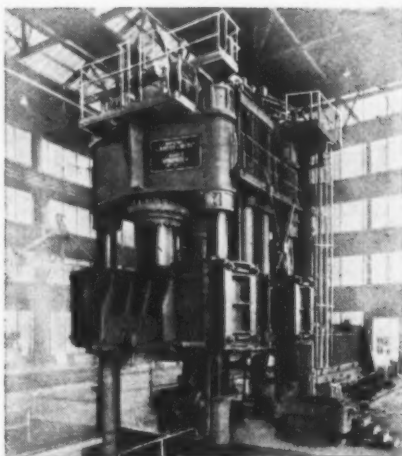
GENERAL  **ELECTRIC**

"No other such equipment exists in America today..."

— says **BABCOCK & WILCOX** for whom **HYDRO PRESS, INC.** designed and engineered it



Designed and engineered by
HYDRO PRESS, INC., built in the
shops of **BABCOCK & WILCOX CO.**



▲ **HYDRO PRESS, INC.** designed and engineered also "The Nation's Largest Press for Forming Boiler Drum Plate", a 6,500 Ton Hydraulic Piercing and Bending Press; a multi-purpose press for forming the heaviest Steel Plate ever rolled—up to max. 42 feet length and 6" wall thickness—into Boiler Drum Sections.

▲ Horizontal Hydraulic Push Bench—largest in America for this purpose—for drawing Alloy and Carbon Steel Ingots or Billets of varying cross sections into seamless tubes and high pressure vessels from a minimum of 8" I.D. up to max. 26" I.D., 4½" Wall Thickness and 22 feet length—at **BABCOCK & WILCOX**, Barberton, Ohio.

● The products made from thick-walled hollow forgings on that installation are sections for steam lines and boiler headers; there are however other uses in the chemical and processing industries, in the petroleum industry and in many others.

LOEWY

HYDRO PRESS INC.

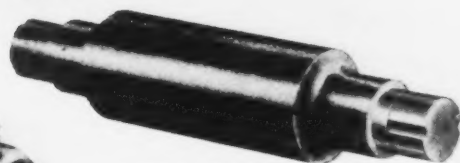
ENGINEERS • CONTRACTORS

Rolling Mills • Hydraulic Presses • Pipe Testing Machines • Special Pipe Mill Equipment • Accumulators • Pumps • Die Casting Machines

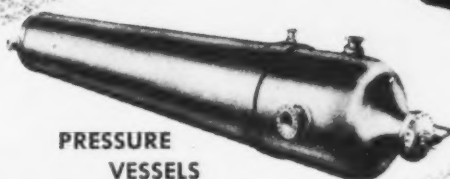
350-B Fifth Avenue (Empire State Building) NEW YORK 1, N. Y.

BIRMINGHAM • CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • PHOENIX • SAN FRANCISCO • SEATTLE • WASHINGTON, D. C. • WHEELING
GENOA, ITALY • LONDON, ENGLAND • MADRID, SPAIN • PARIS, FRANCE • PHILIPPINE ISLANDS

HEADQUARTERS FOR HEAVY STEEL FORGINGS



STEEL ROLLS



PRESSURE
VESSELS



PRESS
CYLINDER



RINGS

Whatever your needs for heavy steel forgings in industry, Midvale can assure you of the finest in craftsmanship, precision and ultimate performance. Whether it is weldless gear rings for turbine speed reduction . . . cylinders for hydraulic presses . . . weldless high-pressure vessels for oil refining, gas reactions and steam generation or hardened and ground steel rolls for cold rolling carbon and alloy steel, stainless steel, aluminum, copper, brass, zinc, foil, paper, linoleum, plastics and rubber . . . Midvale engineers can help you design them. Midvale craftsmen, with the most modern equipment, will build them to your most exacting specifications. Put your heavy forging problems in our hands.

THE MIDVALE COMPANY

NICETOWN, PHILADELPHIA, PENNA.

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO



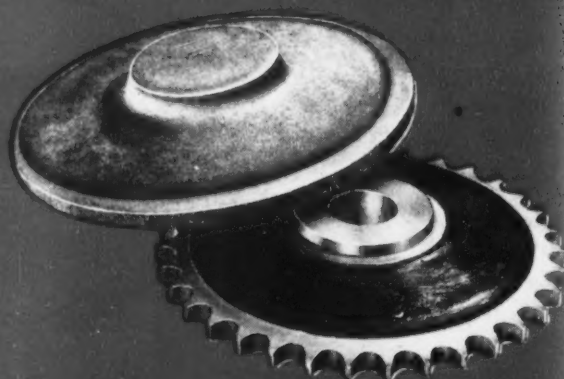
Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Here's what we mean by **SUPERIOR** ENGINEERED FOUNDRY PRODUCTS...

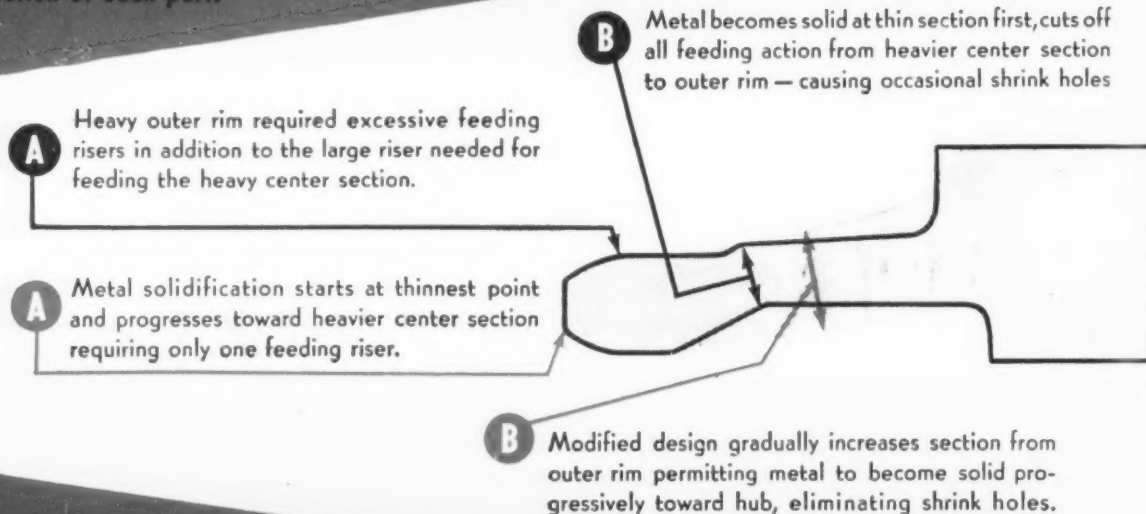
PROBLEM:

1. Conventional design of cast steel sprocket blank impaired proper directional solidification of the metal, causing uncontrolled shrinkage in the outer rim.
2. Assurance of delivery of sound castings was possible only through expensive non-destructive inspection of each blank.
3. Casting and machining losses were excessive.



OUR SOLUTION:

FOUNDY ENGINEERED DESIGN to establish a relationship of tooth, web and hub sections which would insure uniform directional solidification of the metal, place metal where needed most and minimize necessity for expensive inspection of each part.



RESULT: 17.6% SAVINGS

1. Elimination of shrink holes in outer rim through proper directional solidification of the metal.
2. Elimination of need for expensive inspection of each part.
3. Reduced casting and machining costs.

BLACK LINES . . . ORIGINAL DESIGN
RED LINES MODIFIED DESIGN

TOTAL COST OF PART REDUCED 17.6%

YOU TOO CAN GET SAVINGS LIKE THIS! CONSULT OUR PRODUCT DEVELOPMENT SECTION REGARDING YOUR PROBLEM . . . WHILE IT'S STILL ON THE DRAWING BOARD!

LET OUR FOUNDRY ENGINEERS HELP YOU CONSERVE CRITICAL MATERIALS



SUPERIOR STEEL AND MALLEABLE CASTINGS CO.

BENTON HARBOR, MICHIGAN, U. S. A.

How TIMKEN® bearings hold down screwdown maintenance

WITH Timken® flat thrust bearings installed on cold mill breaker blocks, screwdown maintenance is virtually eliminated. Timken flat thrust bearings take the terrific screw loads with minimum friction. Motor overload is drastically reduced, screwdown response is quick and uniform. There's no stripping of worm gears, no costly time-outs for lubrication.

Line contact between rollers and races of Timken bearings provides

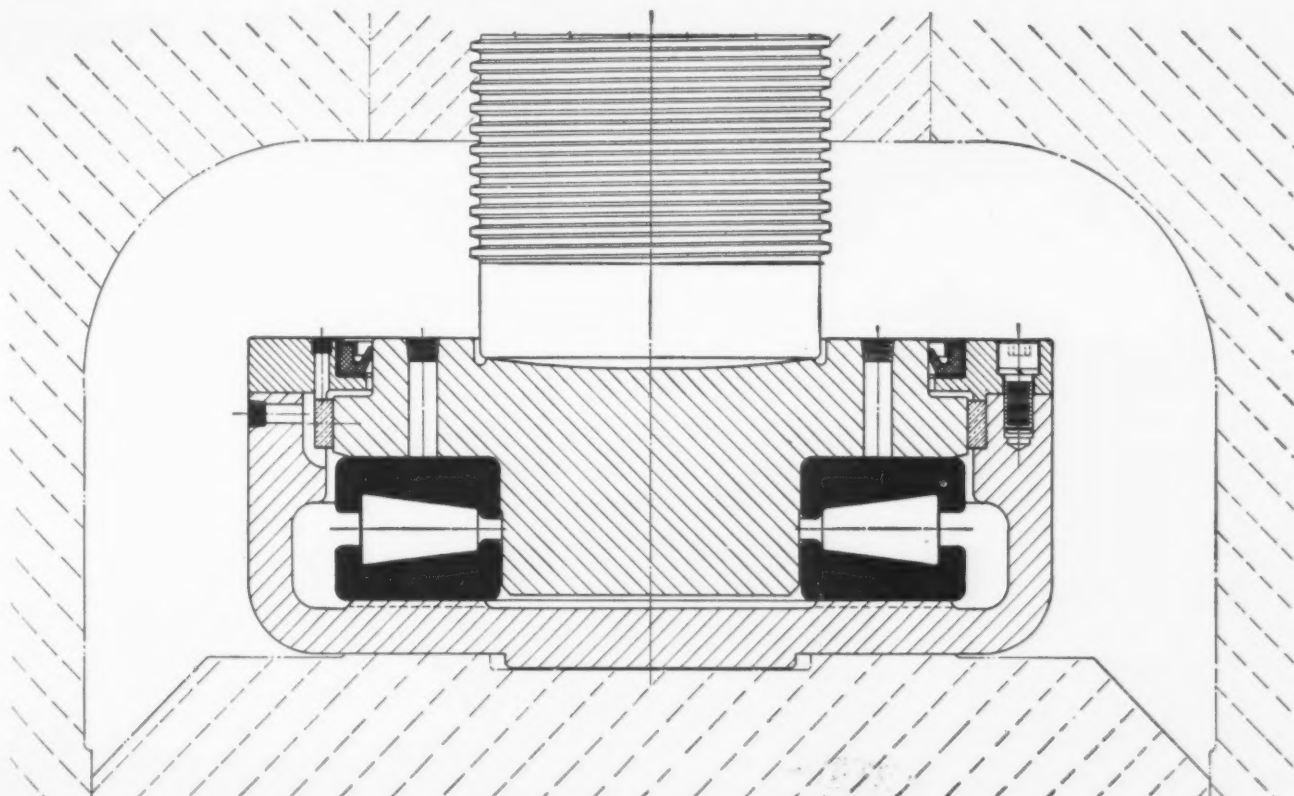
extra load-carrying capacity. Their incredibly smooth surface finish practically eliminates friction. On-apex construction gives them true rolling motion, eliminates skidding and skewing of the rollers.

Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel. And they're case-carburized to give them hard wear-resistant surfaces and tough, shock-resistant cores.

No other bearings give you all the advantages you get with Timken bearings. Always specify them for the machines you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable Address: "TIMROSCO".



This symbol on a product means its bearings are the best.



Drawing shows how Timken flat thrust bearings are mounted on the breaker blocks of a 4-high cold mill to hold down screwdown maintenance and assure long, dependable operation.

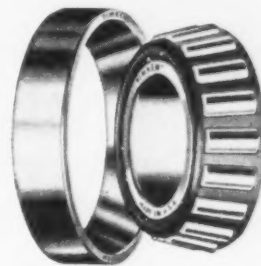


DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

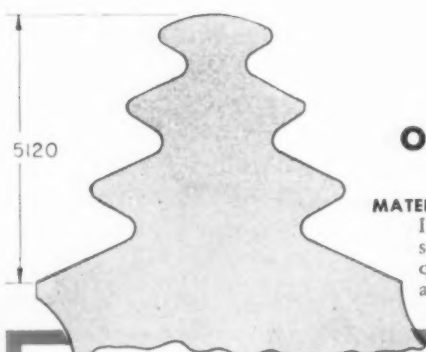
TIMKEN
TAPERED ROLLER BEARINGS



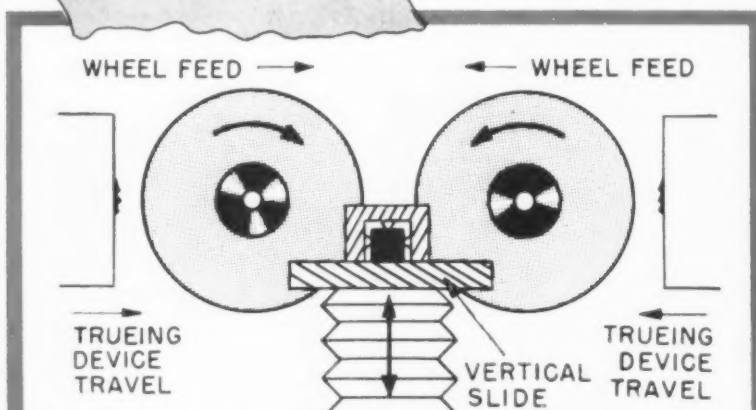
NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

FORM GRINDING JET ENGINE BUCKET ROOTS FROM THE SOLID!

ON J & L DUAL-WHEEL AUTOMATIC FORM GRINDERS



MATERIAL BORDERS ON UNMACHINABLE
Intense heat and great centrifugal stresses on the pressure surfaces require the toughest material and most accurate finish.



Bucket is mounted on a reciprocating vertical slide for two-way grinding.

AUTOMATICITY SPEEDS PRODUCTION — MAINTAINS REPETITIVE ACCURACY—Operation is simplified to the push button stage by a completely automatic work cycle.

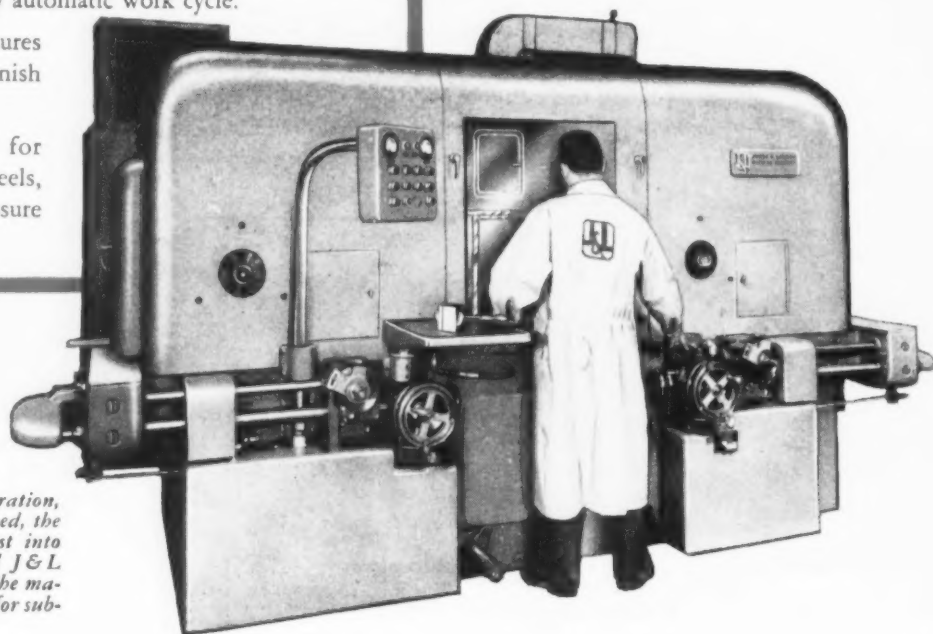
Automatic wheel trueing assures accuracy of form—includes finish trueing before final cut.

Automatic compensation for amount dressed off the wheels, and automatic wheel feed assure accurate sizing.

FEW MORE DIFFICULT GRINDING JOBS EXIST—Yet both sides of the root are ground simultaneously, to gage tolerances, on a production basis.

REPETITIVE ACCURACY MAINTAINED
Spacing of pressure surfaces within .0002
Taper within .0005
Angles within 10 minutes
Thickness from .0005 to .001

ACHIEVEMENT RESULT OF SEVERAL YEARS' RESEARCH AND EXPERIMENTATION—This application of the proven principles, long incorporated in J & L Thread Grinders, was initiated several years ago. The first machine was delivered in 1948. Continued study and subsequent refinements have helped lick one of the toughest machining problems of our day. Perhaps we can help you too.



Before the grinding operation, the foil contour is checked, the blade oriented and cast into a matrix, on a special J & L Optical Comparator. The matrix serves as a fixture for subsequent operations.

JONES & LAMSON



Machine Tool Craftsmen
Since 1835

JONES & LAMSON MACHINE CO., Springfield, Vt., U.S.A. Dept. 710

THREAD GRINDER DIVISION



Saves

on power costs under load
— and during idle and no-
load periods!

Cuts maintenance costs
and downtime delays —
has no moving parts to
wear out!



Protects the primary input
line against unbalanced con-
ditions!

New P&H DC Rectifier Welder with Dial-lectric Control

... Gives you economy,
quiet operation, balanced-line loading,
and instantaneous remote control

Now . . . you get low-cost DC welding current without
a generator, from this new P&H DC Rectifier Welder —
industrial twin to the famous P&H AC Dial-lectric Welder.

No troublesome mechanical devices to control am-
perage — simply turn a single radio-type knob. There
are no moving coils or cores to cause delays and main-
tenance expense — no bearings, brushes, commutator,
brush riggings, etc. to replace.

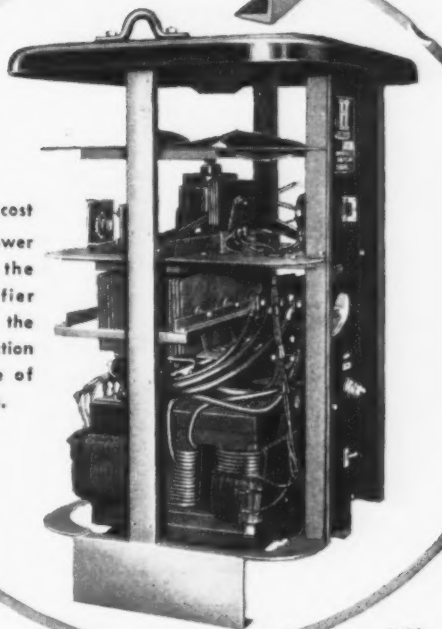
P&H extra-value features like these make this DC
Rectifier a real buy: Thermal overload protection.
Weather-proof housing. Primary line switch. Range
switch. Remote control receptacle. Forced air ventilation.
Hinged side covers. Heavy-duty lifting eyes.

New P&H Rectifiers are coming off the production
line now. Two sizes: 200 and 300 Amps at 40 V. Be
among the first to enjoy the savings this P&H welder
helps you realize on power consumption and maintenance.
Order your P&H DC Rectifier Welder today.

Ask your P&H representative or distributor for further
information on this outstanding unit.



Here's low-cost
DC welding power
at its best — the
P&H DC Rectifier
Welder. Note the
sturdy construction
and absence of
moving parts.



2492

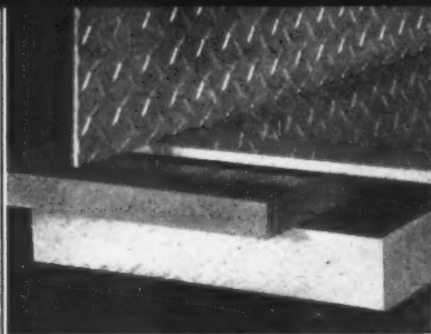


WELDING DIVISION

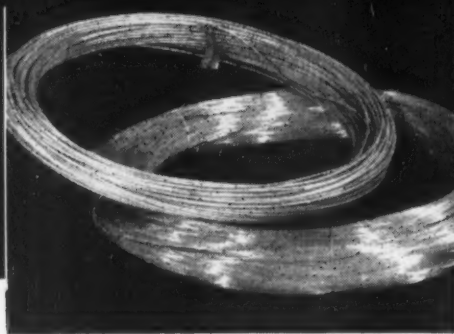
HARNISCHFEGER CORPORATION

4401 W. NATIONAL AVENUE • MILWAUKEE 46, WISCONSIN

Power Shovels • Crawler and Truck Cranes • Overhead Cranes • Hoists • Arc
Welders and Electrodes • Soil Stabilizers • Diesel Engines • Pre-Fabricated Homes



SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.

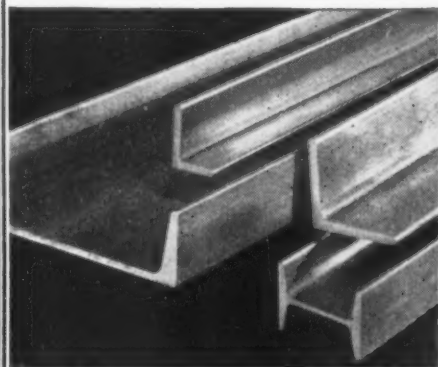


WIRE: Coiled and straight lengths; rivet wire; flattened and slit wire.

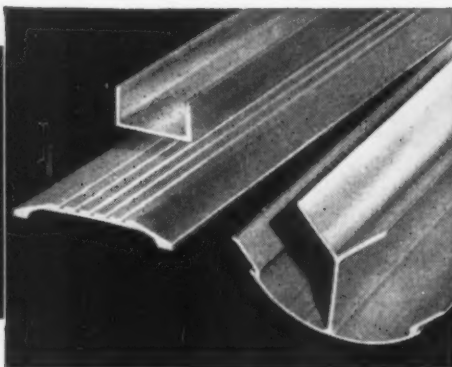


SCREW MACHINE STOCK: All free-cutting alloys plus the higher strength alloys—24S, 61S and 75S.

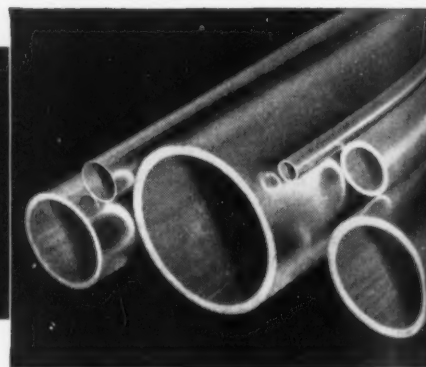
These are the **MILL PRODUCTS of ALCOA**



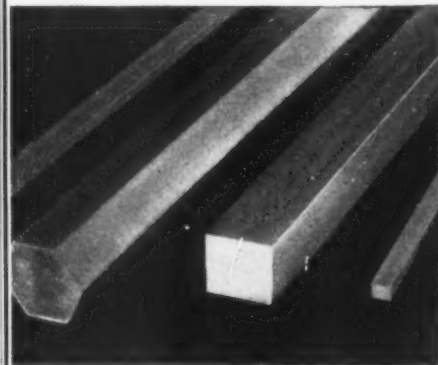
ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; H-beams; Tees; Zees.



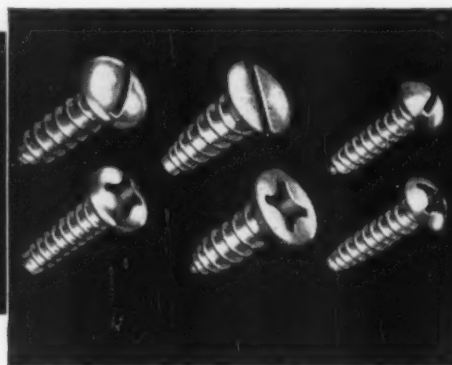
EXTRUDED SHAPES: Miscellaneous extruded shapes such as angles, channels, half rounds, quarter rounds, thresholds, truck corners and structural members, etc. Round, square, and rectangular bars.



TUBE AND PIPE: Coiled tube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; irrigation pipe; rigid conduit.



BAR STOCK: Square, hexagonal and rectangular bar stock in free-cutting and higher strength alloys.



FASTENERS: Machine screws; wood screws; washers; nuts; bolts; rivets.

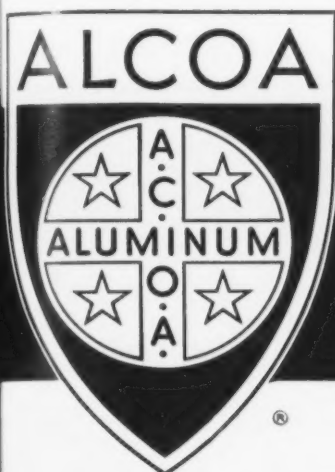


WELDING AND SOLDERING SUPPLIES: Welding and brazing wire; welding and brazing flux; solder flux; solder.

ALUMINUM COMPANY OF AMERICA

They have

these twelve basic advantages
and scores of others



With them

goes the skill of 64 years'
experience in fabricating,
assembling and finishing
aluminum

They are

available from your local
ALCOA sales office,
distributor or jobber

- Lightweight
- High Resistance to Corrosion
- High Electrical Conductivity
- High Conductivity for Heat
- High Reflectivity for Light and Radiant Heat
- Workability
- Nontoxic
- Strength in Alloys
- Nonsparking
- Nonmagnetic
- Appearance
- High Scrap and Re-Use Value

The world's greatest aluminum research and testing facilities are available to help you determine the suitability of aluminum for your products. And to train your personnel, Alcoa offers technical literature and how-to-do-it movies.

For all possible co-operation in filling your orders, call your local Alcoa sales office, distributor or jobber. You'll find them listed under "Aluminum" in your classified phone book.

ALUMINUM COMPANY OF AMERICA
1909K Gulf Bldg. • Pittsburgh 19, Pa.

**ALCOA ALSO MAKES
PRODUCTS TO
CUSTOMER
SPECIFICATION**



CASTINGS . . .

sand, plaster, permanent mold
and die.



FORGINGS . . .

drop, hammer and press
forgings.

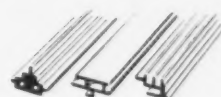


**SCREW MACHINE
SPECIALTIES . . .**

special fasteners and screw
machine parts.



IMPACT EXTRUSIONS



EXTRUDED SHAPES



"SEE IT NOW" with Edward R. Murrow — CBS-TV every
Sunday . . . brings the world to your armchair. Consult
your newspaper for local time and channel.

ALCOA *first in* **ALUMINUM**



If dirt's your problem



here's the
answer -

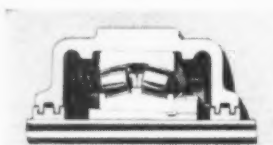
SKF TRIPLE-SEAL "SAF" PILLOW BLOCKS

Here's why the Series SAF Pillow Block is SKF's answer to your problems:

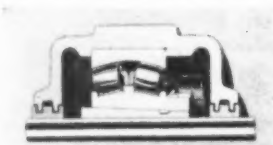
- Triple-Seal rotating rings give positive protection in dirty locations; effectively seal out foreign matter; seal in oil or grease.
- Stabilizing ring between the housing shoulder and the bearing insure fixed position of one held bearing on the shaft and prevents end movement of the shaft.
- Adapter-type bearings permit use of standard shafting, yet provides a *tight fit*.
- Easy to install and inspect; self-aligning.

Write SKF for Folder No. 340 (for complete details), or contact your SKF Distributor.

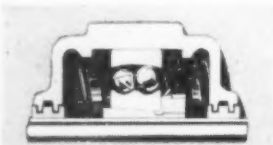
SKF INDUSTRIES, INC., PHILA. 32, PA. — manufacturers of SKF and HESS-BRIGHT bearings.



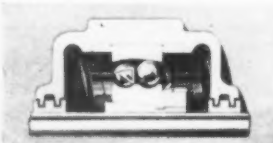
"Free" Spherical Roller Bearing.



Same Pillow Block as above, Bearing "Held" by stabilizing ring.



"Free" Ball Bearing.

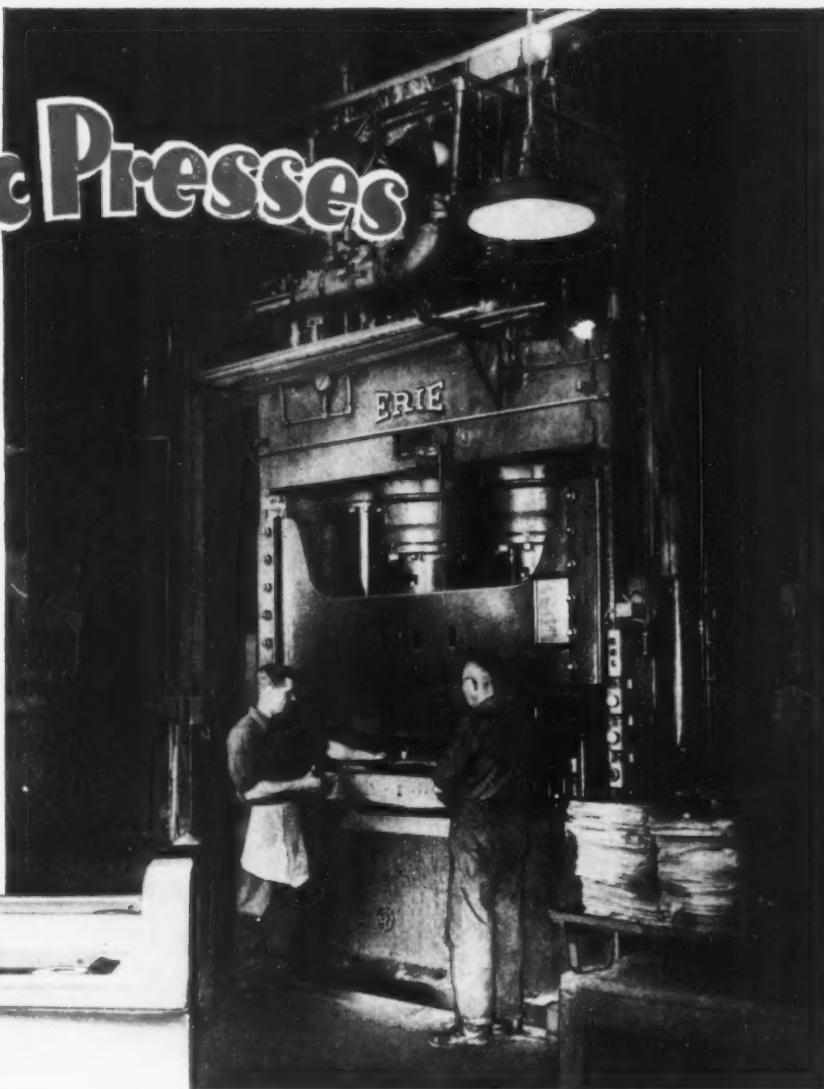


Same Pillow Block as above, Bearing "Held" by stabilizing ring.

Hydraulic Presses

for
the **JOB**
you have to do . . .
by

**ERIE FOUNDRY COMPANY
OF COURSE**



335 TON FAST ACTION HYDRAULIC PRESS...

AT ODIN STOVE MANUFACTURING CO.

THIS Erie Foundry Company Hydraulic Press is typical of the diversity of design and construction available to you in selecting presses best suited to your product. It is forming the smooth, well contoured parts of the famous Odin Beautyrange. Bulletin 350 gives you a clear idea of our ability to meet your hydraulic press requirements. Your copy is ready to be mailed on request.

ERIE
FOUNDRY COMPANY
HYDRAULIC PRESSES

ERIE FOUNDRY COMPANY • Erie, Pa., U.S.A.

DETROIT
335 Curtis Building

CHICAGO
13 South Austin Blvd.

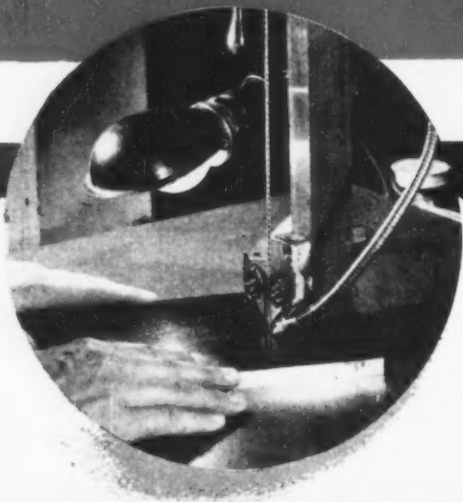
INDIANAPOLIS
2302 N. Meridian Street

NEW ENGLAND
G. V. Eads, Kent, Conn.

*Get a Longer Run
for your Money... with*

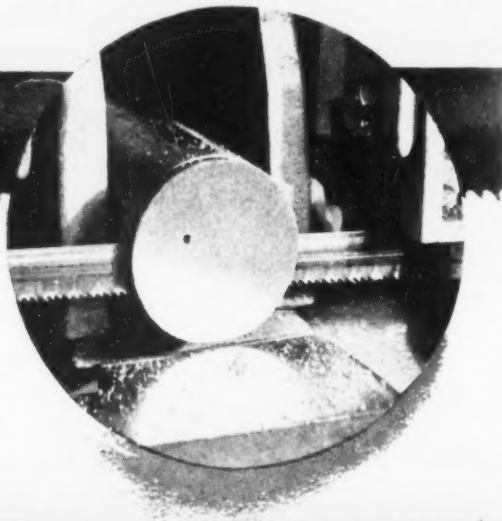
SIMONDS

METAL-CUTTING BAND SAWS



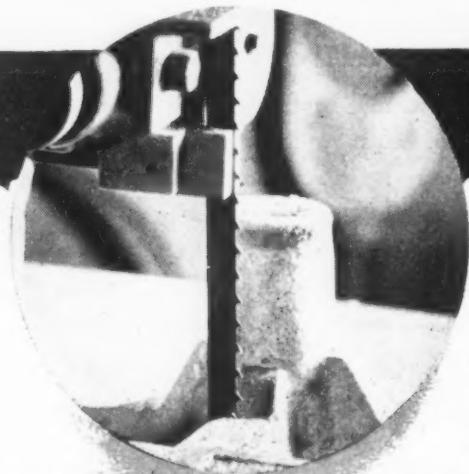
... for Contour Cutting

Made of tough, alloy steel that resists breaking, yet holds a keen cutting edge, Simonds Standard-Tooth Hard-Edge Band Saws in the narrower widths are outstanding favorites for contour work. That's why you'll find them so widely used in die-making and contour sawing of all kinds. Perfectly formed teeth, set with absolute evenness on both sides of the blade, insure smooth, accurate results and greater satisfaction



... for Horizontal Cutting

In the wider widths, these rugged, long-lasting Hard-Edge Blades are "tops" for use on horizontal machines, cutting off bars, tubing, angle iron, etc. Furnished either Regular Set or Wavy Set to handle the variety of cutting encountered in steel warehouses and general shop work. Hardy new 100' and approximately 300' coil containers insure factory perfect saw blades. Welded-to-length saws also supplied.



... for Non-Ferrous Cutting

Simonds Hard-Edge Skip-Tooth Band Saws are especially adapted for use on soft materials such as aluminum, magnesium, plastics, and hardwoods ...provide extra gullet capacity with maximum blade strength...are widely used in brass and aluminum foundries and plastic fabricating plants. Your Simonds Distributor will supply you with the right blade for your job.

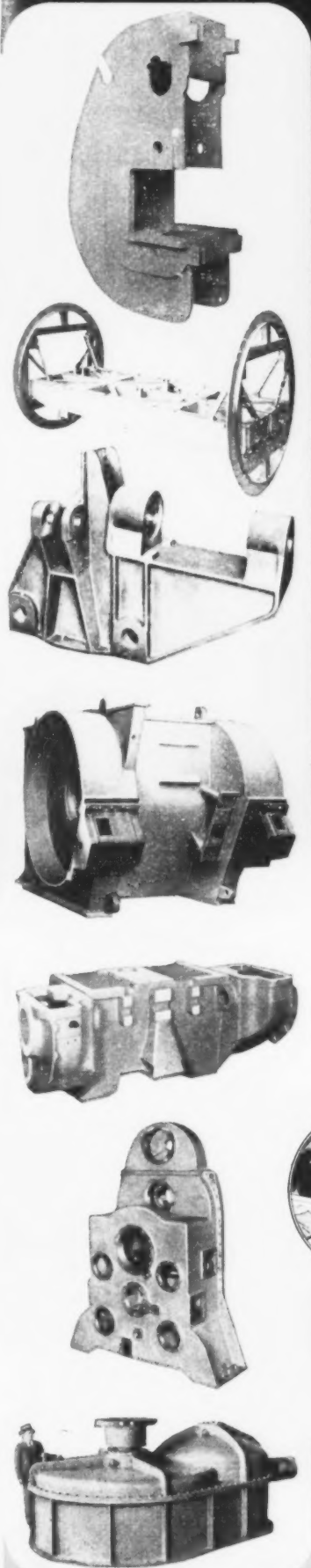
SIMONDS
SAW AND STEEL CO.

FITCHBURG, MASS.

*Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon.
Canadian Factory in Montreal, Que.
Southern Service Shop in Meridian, Miss. (formerly J. H. Miner Saw Mfg. Co.).
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.,
Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada*

Steel-Weld

FABRICATION



Use WELDED STEEL
for Greater Strength
with Less Weight!

Illustrated above are parts of a pneumatic pipeline conveying system. Each unit embodies an Air Operated Swing Check Valve and Lower Pressure Chamber. These completely machined and assembled units, together with those at the left, are presented as further evidence of the versatility of the Mahon organization in producing and machining Steel-Weld Fabricated parts and assemblies for hundreds of manufacturers throughout the country. If you have parts or assemblies in your product that could be redesigned and produced to better advantage from a strength—weight—bulk standpoint, or, if you are faced with a limited production on an item involving heavy pieces in which pattern costs are a consideration, you can turn to Mahon with confidence. You will find in the Mahon organization a unique source with complete, modern fabricating, machining and handling equipment to cope with any type of work regardless of size or weight . . . a source where skillful designing and advanced fabricating technique are supplemented by craftsmanship which assures you a smoother, finer appearing job, embodying every advantage of Steel-Weld Fabrication.

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN

Engineers and Fabricators of Steel in Any Form for Any Purpose

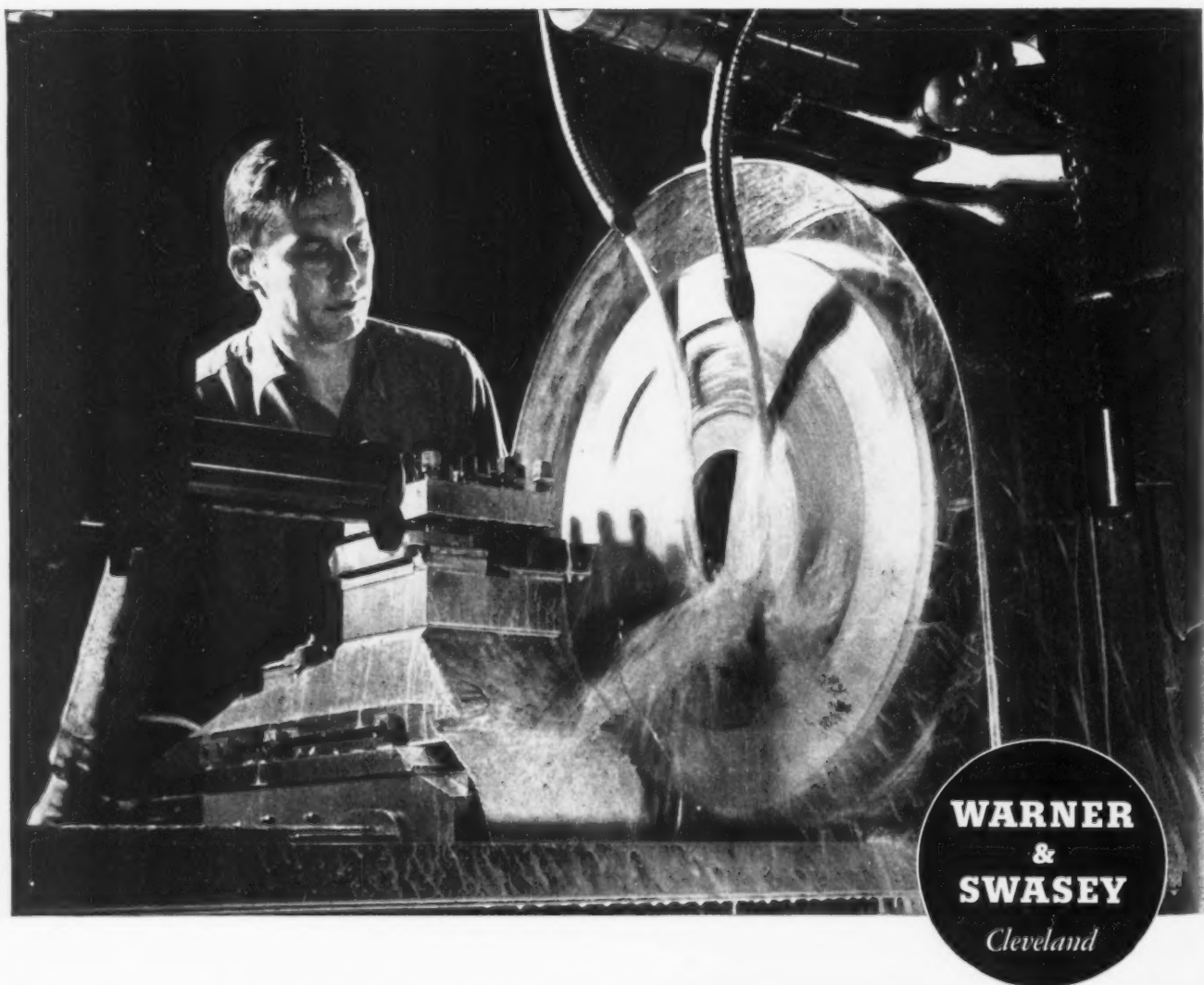
MAHON

POWERED FOR PRODUCTION

WARNER & SWASEY SADDLE TYPE TURRET LATHES deliver tremendous power for the toughest jobs. The one-piece bed, with integrally cast head and VEE-WAYS, carries massive solid weight at the right places. And with diagonal cross-ribbed reinforcing it insures the rigidity that holds accuracy.

You can really hog off tough metal *fast* with any Warner & Swasey Heavy Duty Machine. You can give the job everything that carbide tooling can take.

And along with power, these machines have an industry-wide reputation for *holding* their precision accuracy. Warner & Swasey's are built to provide the right combination of power, speed and accuracy for the most rugged, heavy duty service throughout many years of trouble-free service.



YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS, AND TAPPING MACHINES



"THERE SHE BLOWS"

From one end of the oil country to the other, McKay Chain is at work helping hit pay sands. But then—you'll find McKay Chain everywhere doing the useful jobs of lifting, hauling, rigging, tying, spinning and other material and power transfer applications.

In every industry—there is a
McKAY CHAIN FOR EVERY USE . . .
no job is too big, none too small!

McKAY CHAIN BULLETINS

- Sling Chain • General-Purpose Chain
- Oil Country Chain • Tractor-Truck Chain

Write for the bulletins you need.



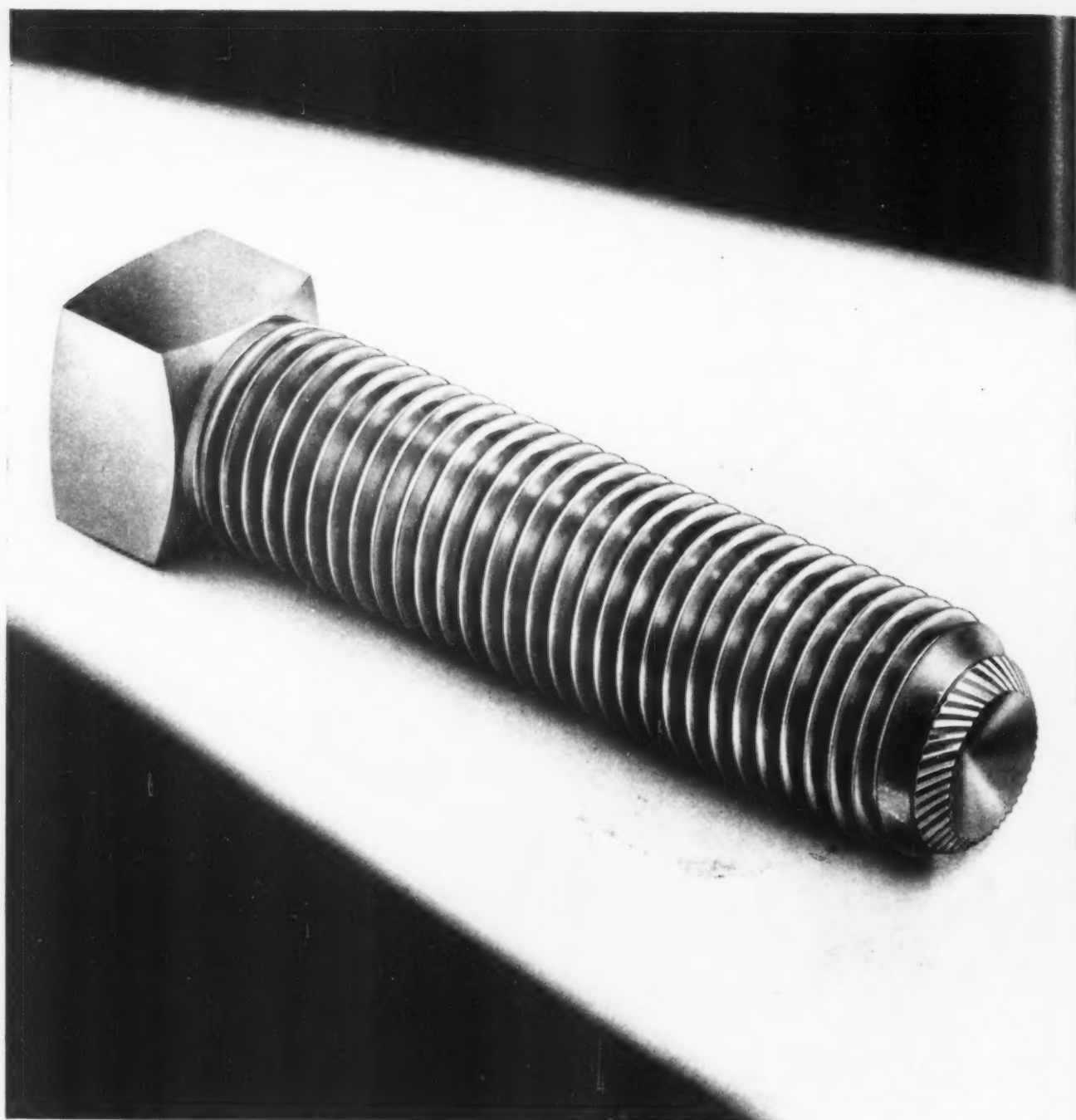
McKAY CHAIN

for Every Use

McKAY—A GOOD NAME FOR GOOD CHAIN—SINCE 1881



The McKAY Company • 447 McKay Building • Pittsburgh 22, Pennsylvania



UNBRAKO[®] SQUARE HEAD SET SCREWS are consistently strong self-lockers

Heads that *will not twist off* and points that will not work *loose* are UNBRAKO features. These screws are particularly useful in severe service applications and on high speed, vibrating equip-

ment. Write for your copy of UNBRAKO *Standards*. STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

Standard points are self-locking knurled cup and half dog. Standard sizes are 1/4" to 1". They are available from distributors' shelves.

UNBRAKO SOCKET SCREW DIVISION

SPS JENKINTOWN, PENNSYLVANIA

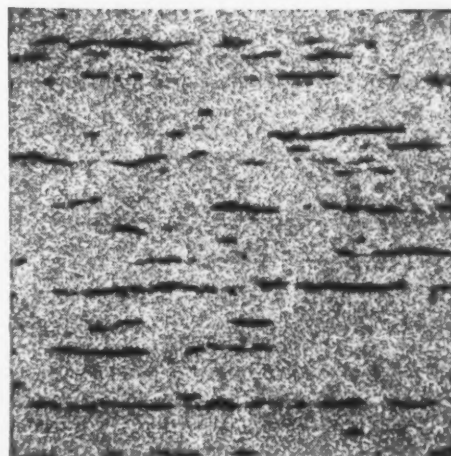
TESTS PROVE GRAPH-MO® BEST STEEL FOR GAGES!

Reports from users show Graph-Mo steel outwears other tool steel 3 to 1!

Graph-Mo® steel is today's big news for gage users and gage makers. The difference between Graph-Mo steel and other gage steels is so real you can see it—in the form of tiny, scattered, parallel marks barely visible on the surface of a polished piece of Graph-Mo. It's the "graphitic look"!

These marks indicate the presence of free graphite in the steel's structure. And this free graphite, together with diamond-hard carbides, enables Graph-Mo to outwear other tool steels an average of 3 to 1 according to reports from dozens of gage users. Tests prove Graph-Mo is also the most stable gage steel ever made. (see below).

Photomicrograph at right shows the free graphite and diamond-hard carbide that give Graph-Mo unusual wear resistance. They minimize scuffing, pick up and galling, and resist abrasion. Graph-Mo machines 30% faster than other tool steels, gives uniform response to heat treatment, and is available now!



100X



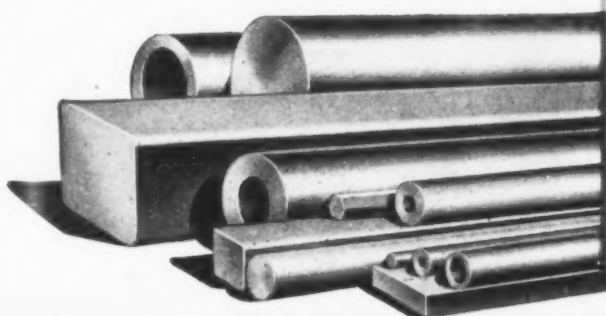
12-year stability test proves Graph-Mo steel master gage stays within 10 millionths of its original dimension

Here's proof of Graph-Mo's outstanding stability. These measurements were taken on a typical Graph-Mo steel master plug gage over a 12-year period. They show only 10 millionths of an inch change after that time.

1940—1.73996 1941—1.73995 1942—1.73998 1943—1.73997
1944—1.73996 1945—1.73995 1948—1.73997 1951—1.73995

You can always tell Graph-Mo by its "graphitic look". This built-in "trade-mark", the result of the free graphite in its structure, can't be duplicated in other steels. Look for it, next time you buy gages. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
Fine Alloy
STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

October 9, 1952

THE IMPROVED Exide-Ironclad BATTERY

GIVES you more...SAVES you more

It gives you more of everything that adds up to top performance, long battery life...saves you more through low over-all costs. Outstanding new features, including the polyethylene insulating tube sealer, *more than ever before*, make Exide-Ironclad YOUR BEST POWER BUY...AT ANY PRICE.

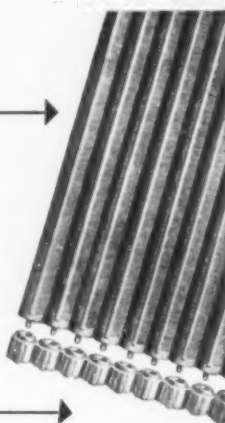
HERE'S WHAT YOU GET

Rapid, accurate handling...
Uniform rate of handling...
High availability... Low operating costs...
Low maintenance costs... Low depreciation costs...
High maneuverability... Safe handling

AND HERE'S WHY

IMPROVED POSITIVE PLATE CONSTRUCTION. The long-life grids now contain SILVIUM—an alloy of silver, lead and other components—which make them highly corrosion-resistant.

NEW POLYETHYLENE INSULATING TUBE SEALER of acid-proof, non-corroding plastic. It fits snugly into slotted tubes of positive plates, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus more active material remains available, and the high battery capacity is maintained for a longer working life.



PLUS THESE EXTRAS

IMPROVED NEGATIVE PLATES for higher electrical efficiency.

NEW SEALING COMPOUND provides permanent seal between jar and cover.

SEAMLESS SHOCK-PROOF JAR, of high quality rubber, combines tensile strength and elongation for long-life and heavy-duty service.

NEW UNBREAKABLE PLASTIC VENT PLUGS of polyethylene.

TYPES, SIZES AND CAPACITIES for all kinds and makes of battery-electric trucks—hand and rider.

THE ELECTRIC STORAGE BATTERY COMPANY

Philadelphia 2

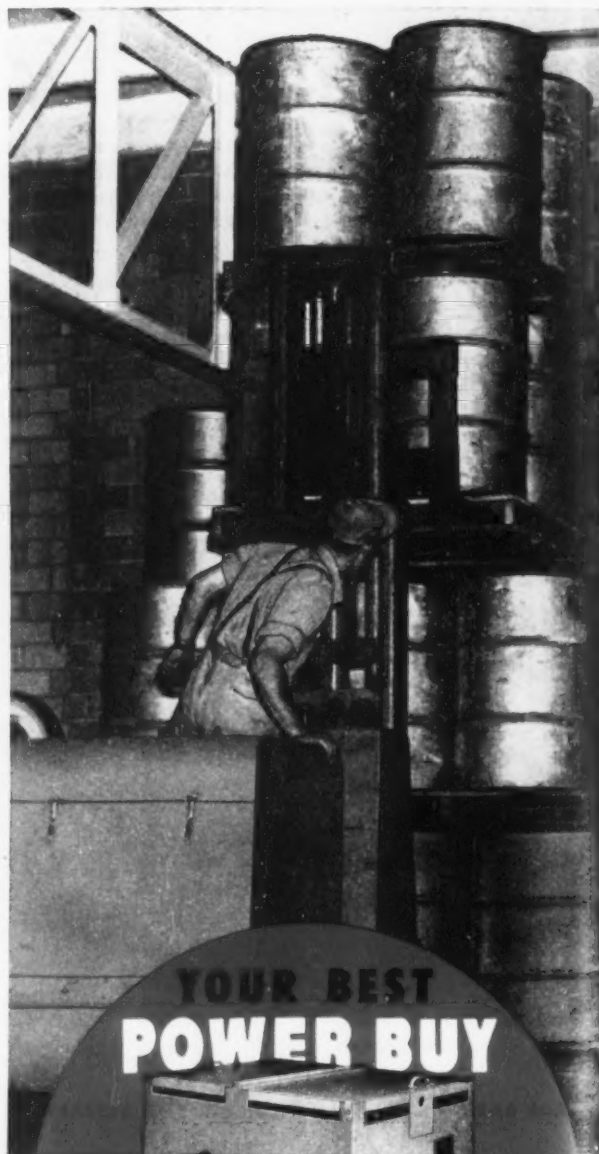
Exide Batteries of Canada, Limited, Toronto

1888

DEPENDABLE BATTERIES FOR 64 YEARS

1952

"EXIDE-IRONCLAD" and "SILVIUM" Reg. T.M. U.S. Pat. Off.



**YOUR BEST
POWER BUY**



AT ANY PRICE

The inside story of a new power-pump design

THE WORTHINGTON HEAVY-DUTY MULTI-PLUNGER* VERTICAL POWER PUMP

To users of Worthington pumps, "heavy-duty construction" is almost taken for granted. But when Worthington engineers make a special effort to put *extra* ruggedness into a pump, you have something comparable to this Worthington Multi-Plunger Power Pump. Study the features and see for yourself!

ON THE LIQUID END

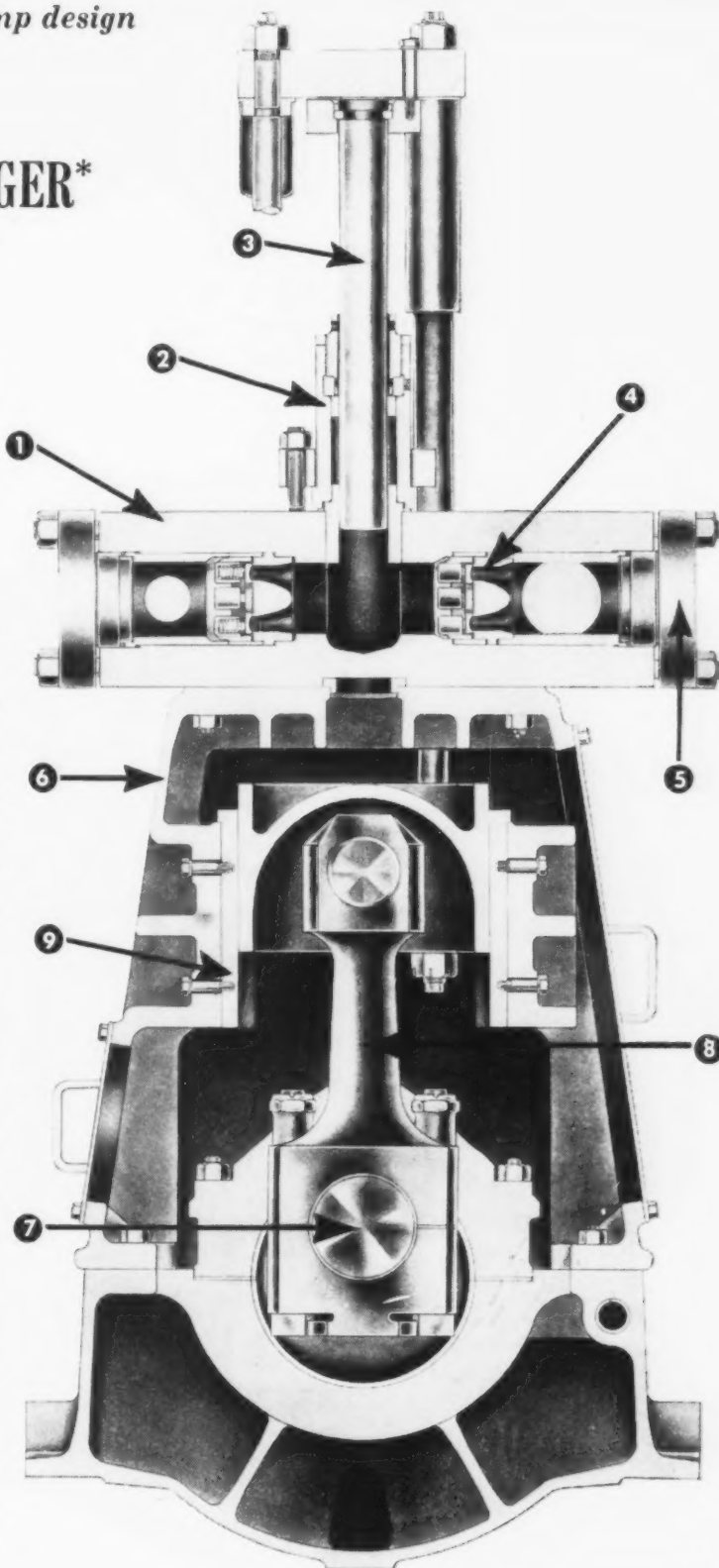
1. LIQUID CYLINDER—made of forged steel with large fluid passageways bored from solid forgings for maximum strength.
2. STUFFING BOXES—forged-steel barrels, bolted directly to cylinder with extra-deep boxes that permit maximum interchange of plunger sizes.
3. PLUNGERS—made from hardened and ground alloy steel or any other suitable metal. Solid ceramic plungers can be furnished for corrosive applications.
4. VALVE SERVICE—stainless-steel, heat-treated valves and valve seats. High-strength valve springs and bolted valve-hole covers.
5. INDIVIDUAL VALVE HOLE COVERS—one for each valve, permits quick and easy access.

ON THE POWER END

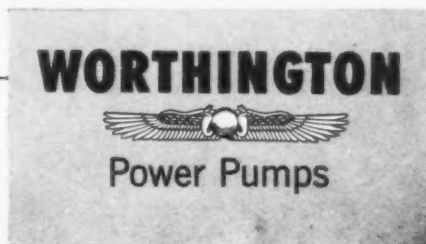
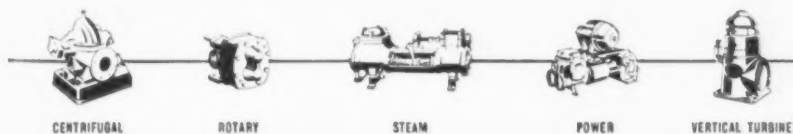
6. CAST-IRON FRAME—totally enclosed, with design that permits torque to be applied near foundation. All bearing surfaces and running parts pressure lubricated.
7. ONE-PIECE STEEL CRANKSHAFT—one-piece forged steel, accurately turned and ground to size. Heavy sections for minimum shaft deflection when loaded.
8. CONNECTING ROD—marine-type, forged-steel, with steel-backed, babbitt-lined crankpin bearings and solid bronze crosshead pin bearings.
9. CROSSHEAD CRADLE LINERS—solid cast iron with bronze liner shim adjustable to permit careful alignment.
10. BRONZE-SHELL MAIN BEARINGS†—two-piece bronze shell design babbitt-lined with large bearing surface for longest-life. Precision made for trouble free operation.

If your application calls for a power pump of this size, or any other size, write, stating specific requirements, to Worthington Corporation, Reciprocating Pump Division, Harrison, New Jersey.

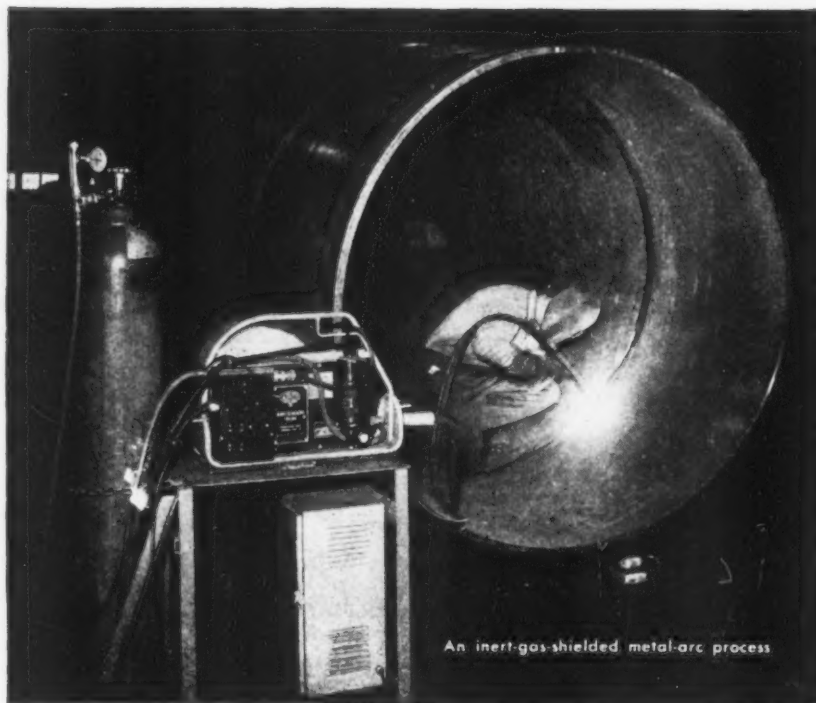
*available in 3, 5 or 7 plunger arrangements (300, 500, 700 hp)
†not shown in drawing



P.2.2



The World's Broadest Line Assures You the Right Pump for Every Job



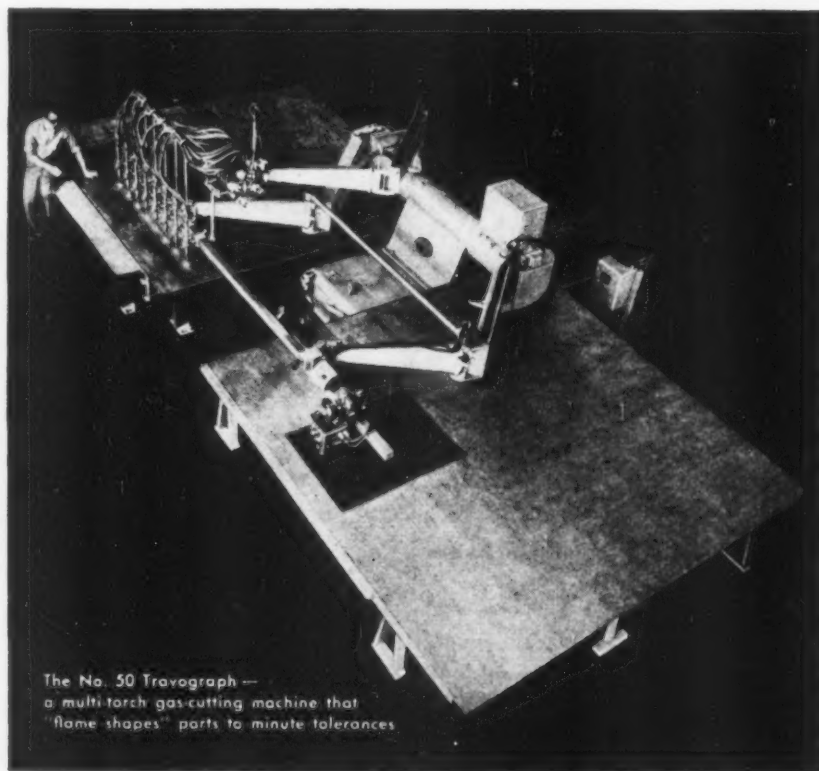
An inert-gas-shielded metal-arc process

AIRCOMATIC® WELDING for hard-to-join metals

- Continuous high-rate deposition of filler metal
- Welds aluminum, bronze, nickel, stainless & carbon steels
- No flux required — no slag removal
- Minimum plate-edge preparation
- Heavy section welding with little or no preheat
- No "blind" welding — always a visible arc
- A semi-automatic operation with the versatility of all-position welding



PRESENTS THE LATEST

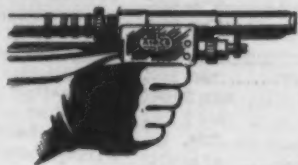


The No. 50 Travograph — a multi-torch gas-cutting machine that "flame shapes" parts to minute tolerances

TRAVOGRAPH® CUTTING for mass producing intricate shapes

- "Electronic bloodhound" tracing device accurately reproduces template or outline drawings
- Handles light plates, heavy slabs, billets or forgings
- Straight cutting, beveling or squaring
- All-welded construction for durability and precision
- Torch arm will support up to 8 cutting torches
- Precision shapes up to 102" x 144" — circles up to 12' in diameter — with one 16' set of rails. Cutting length extended with additional rail

at CONVENTION HALL
in PHILADELPHIA



Airco will bring you an "operators-eye-view" of the Aircomatic welding process . . . a continuous "live" demonstration of the #50 travograph. Here's a rare opportunity to view the latest in welding and cutting equipment! Movies . . . Exhibits . . . Welding Apparatus . . . Stationary and Portable Cutting Machines . . . Gas and Arc Welding Accessories.

IN WELDING AND CUTTING!

SEE 'EM IN ACTION!
THE
NATIONAL METALS
CONVENTION
OCT. 20-24
BOOTH 1623



DEALERS
AND OFFICES IN
MANY PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

at the frontiers of progress you'll find



ELECTROMET *Data Sheet*

Published by Electro Metallurgical Company, A Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

PRODUCT *	NOMINAL COMPOSITION	USES
BORON ALLOYS		
Ferroboron Min. 10.00% Boron Grade	Silicon.....max. 1.50% Aluminum.....max. 0.50% Carbon.....max. 1.50%	Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys.
Min. 17.50% Boron Grade	Silicon.....max. 1.50% Aluminum.....max. 0.50% Carbon.....max. 0.50%	
Manganese-Boron	Boron.....min. 17.50% Manganese.....approx. 75% Silicon.....max. 1.50% Carbon.....max. 3% Iron.....max. 5%	Used to cleanse and deoxidize non-ferrous alloys.
Nickel-Boron	Boron.....15 to 18% Silicon.....max. 1.50% Aluminum.....max. 1.00% Carbon.....max. 0.50% Iron.....max. 3.00% Nickel.....Balance	Special boron alloy used principally for deoxidizing nickel and its alloys.
Boron Carbide	Boron.....45 to 50% Carbon.....45 to 50%	Deoxidizer for non-ferrous alloys.
Calcium Boride	Boron.....38 to 42% Calcium.....27 to 32% Carbon.....15 to 20%	Welding rod coating.

CALCIUM ALLOYS		
Calcium-Silicon	Calcium.....30 to 33% Silicon.....60 to 65% Iron.....1.50 to 3%	Deoxidizer for quality ingot steel. Also used in high-tensile gray irons.
Calcium-Manganese-Silicon	Calcium.....16 to 20% Manganese.....14 to 18% Silicon.....53 to 59%	A complex deoxidizer used widely in production of steel castings.
Calcium Metal Regular Grade	Calcium.....98% (Cylinders, Slabs, Cut Pieces, or Turnings)	Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium.
Distilled Grade	Calcium.....approx. 99.90% (Irregular pieces from pea size to 14 in. lumps)	For special applications requiring calcium of very high purity.

CHROMIUM ALLOYS		
Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon (10 Grades) max. 0.03 to max. 2.00%	Production of stainless steels and high-temperature alloys requiring low carbon content.
High-Carbon Ferrochrome Max. 4.50, 5.00, or 6.00% Carbon Grade Max. 7.00% Carbon Grade Min. 7.00% Carbon Grade	Chromium.....67 to 70% Silicon.....1 to 2% Chromium.....66 to 69% Silicon.....1 to 3% Chromium.....65 to 68% Silicon.....1 to 3%	For production of engineering alloy steels and other alloy steels of moderate chromium content.
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon.....max. 0.10% Nitrogen.....approx. 0.75%	For additions of nitrogen to improve properties of high-chromium steels.
"SM" Ferrochrome	Chromium.....60 to 65% Silicon.....4 to 6% Carbon.....4 to 6% Manganese.....4 to 6%	A high-solubility chromium addition for steel or iron in either furnace or ladle.
Exothermic Ferrochrome	Chromium.....60% approx. Carbon.....4.5% max.	An improved exothermic ladle alloy with high solubility, low carbon pickup, and high ignition temperature.
Exothermic Silicon-Chrome	Chromium.....46% approx. Silicon.....23% approx. Carbon.....1.00% max.	An improved exothermic ladle alloy with high solubility, very low carbon pickup, and high ignition temperature.

CHROMIUM ALLOYS cont.		
Foundry Ferrochrome High-Carbon Grade	Chromium.....62 to 66% Silicon.....7 to 10% Carbon.....5 to 7%	Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron.
Low-Carbon Grade	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	
Chromium Metal Low-Carbon Grades	Chromium.....min. 97% Carbon.....max. 0.10% and 0.50%	Production of wide variety of non-ferrous chromium-bearing alloys, including electrical resistance alloys and high-temperature alloys.
High-Carbon Grade	Iron.....max. 1% Chromium.....87 to 90% Carbon.....9 to 11% Iron.....max. 1.25%	
"EM" Ferrochrome-Silicon No. 1 Grade	Chromium.....39 to 41% Silicon.....42 to 46% Carbon.....max. 0.05%	In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath.
No. 2 Grade	Chromium.....36 to 39% Silicon.....36 to 39% Carbon.....max. 0.05% Aluminum.....7 to 9%	
"EM" Ferrosilicon-Chrome	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium.
"EM" Chromium Briquets (Hexagonal Shape)	Chromium.....2 lb. Total Weight.....3 3/4 lb.	For adding chromium to cast iron in the cupola.

COLUMBIUM ALLOYS		
Ferrocolumbium	Columbium.....50 to 60% Silicon.....max. 8% Carbon.....max. 0.40%	Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys.
Ferrotantalum-Columbium	Columbium.....approx. 40% Tantalum.....approx. 20% Cb + Ta.....min. 60% Silicon.....4 to 6% Carbon.....max. 0.30%	Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys.

MANGANESE ALLOYS		
Standard Ferromanganese Regular Grade Low-Phosphorus Grade	Manganese.....78 to 82% Carbon.....approx. 7% Silicon.....max. 1% Manganese.....78 to 82% Carbon.....max. 7% Silicon.....max. 2% Phosphorus.....max. 0.10%	Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron.
Low-Carbon Ferromanganese Low-Phosphorus Grade Regular Grades	Manganese.....min. 90% Carbon.....max. 0.07% Phosphorus.....max. 0.06% Manganese.....85 to 90% Carbon.....max. 0.07, 0.11 to 0.15, 0.30, or 0.50% Manganese.....80 to 85% Carbon.....max. 0.75% Silicon.....5 to 7%	Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type.
Medium-Carbon Ferromanganese	Manganese.....80 to 85% Carbon.....max. 1.25 to 1.50%	For making low- and medium-carbon manganese steel and Hadfield steel.
Silicomanganese Max. 1.50% Carbon Grade Max. 2.00% Carbon Grade Max. 3.00% Carbon Grade	Manganese.....65 to 68% Silicon.....18 to 20% Manganese.....65 to 68% Silicon.....15 to 17.50% Manganese.....65 to 68% Silicon.....12 to 14.50%	A versatile alloy useful as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace.

*All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

PRODUCT*	NOMINAL COMPOSITION	USES
MANGANESE ALLOYS cont.		
Low-Aluminum Ferro-manganese	Manganese.....85 to 90% Carbon.....approx. 7.00% Silicon.....max. 3% Iron.....max. 2%	For high manganese additions to certain non-ferrous alloys, particularly aluminum.
Manganese Metal	Manganese.....min. 96% Carbon.....max. 0.20% Silicon.....max. 1.00% Iron.....max. 2.50%	Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys.
"EM" Silico-manganese Briquets (Square Shape)	Manganese.....2 lb. Silicon.....½ lb. Total Weight.....3½ lb.	For adding manganese (with silicon) to cast iron in the cupola.
"EM" Ferro-manganese Briquets (Oblong Shape)	Manganese.....2 lb. Total Weight.....3 lb.	For adding manganese (without silicon) to cast iron in the cupola.

SILICON ALLOYS

50% Ferrosilicon		Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency.
Regular Grade	Silicon.....47 to 51%	
Blocking Grade	Silicon.....47 to 51%	
Low-Aluminum Grade	Silicon.....47 to 51% Aluminum.....max. 0.40%	
65% Ferrosilicon		For furnace or ladle addition to carbon and alloy steels. Mainly for production of electrical sheet steel
Regular Grade	Silicon.....65 to 70%	
Low-Aluminum Grade	Silicon...61.50 to 66.50% Aluminum.....max. 0.50%	
75% Ferrosilicon		Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron.
Regular Grade	Silicon.....73 to 78%	
Low-Aluminum Grade	Silicon.....73 to 78% Aluminum.....max. 0.50%	
85% Ferrosilicon		Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron.
Regular Grade	Silicon.....83 to 88%	
Low-Aluminum Grade	Silicon.....83 to 88% Aluminum.....max. 0.50%	
90% Ferrosilicon		Permits large additions of silicon without harmful chilling effect.
Regular Grade	Silicon.....92 to 95%	
Low-Aluminum Grade	Silicon.....92 to 95% Aluminum.....max. 0.50%	
Silicon Metal		Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties.
Regular Grade	Silicon.....min. 97 or 96% Iron.....max. 1 or 2%	
Purified Grade	Silicon...99.70 to 99.90% Iron.....005 to .015%	For applications in non-ferrous industry requiring silicon of high purity.
Low-Calcium Grade	Silicon.....min. 97% Iron.....max. 1% Calcium.....max. 0.10%	For the production of high-silicon aluminum alloys where calcium is detrimental.
Low-Aluminum Grade	Silicon.....min. 98% Iron.....max. 1% Aluminum.....max. 0.10%	For the production of silicon-copper alloys where aluminum is detrimental.
"SMZ" Alloy		Particularly strong graphitizing inoculant used in making ladle additions to cast iron.
Special Graphitizer		Deoxidizer and graphitizer for cast iron.
Magnesium-Ferrosilicon		For ladle addition to cast iron to obtain special properties.
Barium-Silicon		For deoxidation of non-ferrous alloys.
"EM" Silicon Briquets (Cylindrical Shape)		
Large Size	Silicon.....2 lb. Total Weight.....5 lb.	For adding silicon to cast iron in the cupola.
Small Size	Silicon.....1 lb. Total Weight.....2½ lb.	

*Electromet, "EM," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

PRODUCT*	NOMINAL COMPOSITION	USES
TITANIUM ALLOYS		
Ferrotitanium	Titanium.....27 to 32% Carbon.....max. 0.10%	For stabilized austenitic stainless steels and high-temperature metals.
Silicon-Titanium	Titanium.....40 to 50% Silicon.....45 to 50% Iron.....max. 3%	For additions of titanium to steels or non-ferrous alloys.
Manganese-Nickel-Titanium	Titanium.....43 to 48% Nickel.....approx. 25% Manganese.....max. 8%	Deoxidization of nickel alloys.

TUNGSTEN ALLOYS

Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-39	For production of tool and die steels; also high-temperature alloys.
Tungsten Metal Powder		
Melting Grade	Tungsten.....min. 98.80% Total Carbon.....max. 0.25%	Production of tungsten steels and cast tungsten carbide.
Calcium Tungstate	Tungstic Oxide.....68 to 72%	For making tungsten chemicals and other tungsten products.
Calcium Tungstate Nuggets	Tungstic Oxide.....68 to 72%	Making tool steels and high-temperature alloys by direct reduction.
Ammonium Paratungstate	Tungstic Oxide.....min. 88.7%	Intermediate for tungsten products.

VANADIUM ALLOYS

Ferrovandium	Vanadium.....50 to 55% Carbon.....max. 0.20, 0.50, or 3.00% Silicon.....max. 1.50, 2.00, or 8%	Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons.
Vanadium Oxide Fused	V ₂ O ₅.....86 to 89% Na ₂ O.....approx. 10% CaO.....approx. 2%	For addition of vanadium to steel and for manufacturing catalysts.
Sodium Polyvanadate (Red Cake)	V ₂ O ₅.....approx. 85% Na ₂ O.....approx. 9% CaO.....approx. 2% H ₂ O.....approx. 2.5%	For manufacture of vanadium compounds, including vanadium catalysts.
High-Purity Ammonium Metavanadate	V ₂ O ₅.....approx. 99.50% NH ₄ VO ₃.....min. 99%	

ZIRCONIUM ALLOYS

12 to 15% Zirconium Alloy	Zirconium.....12 to 15% Silicon.....39 to 43% Carbon.....max. 0.20%	This is a powerful deoxidizer. It also increases depth of hardening.
35 to 40% Zirconium Alloy	Zirconium.....35 to 40% Silicon.....47 to 52% Carbon.....max. 0.50%	Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium.
Nickel-Zirconium	Zirconium.....25 to 30% Nickel.....40 to 50%	For deoxidizing and degasifying nickel alloys.

IF YOU HAVE A METALS PROBLEM

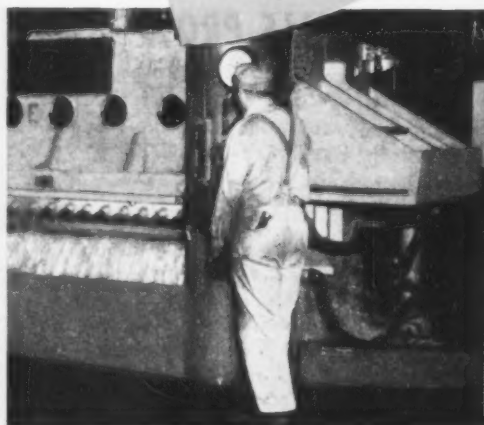
More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET's specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

Birmingham 3, Ala.....Brown-Marx Building
Chicago 1, Ill.....230 N. Michigan Avenue
Cleveland 14, Ohio.....Union Commerce Building
Detroit 2, Mich.....6-240 General Motors Building
Houston 11, Texas.....6119 Harrisburg Boulevard
Los Angeles 58, Calif.....2770 Leonis Boulevard
New York 17, N. Y.....30 East 42nd Street
Pittsburgh 22, Pa.....2207 Oliver Building
San Francisco 6, Calif.....22 Battery Street
In Canada: Electro Metallurgical Company of Canada Limited, Welland, Ontario

When The Heat's On...

Every Facility for Producing Armor Plate

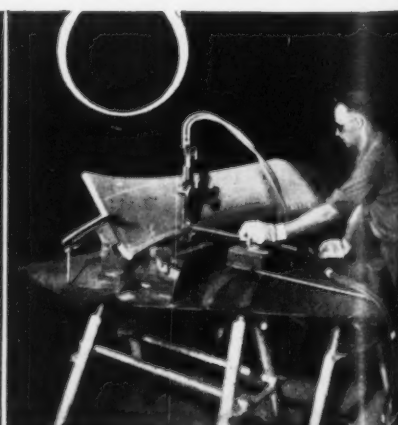
Ready to Assemble
In Gauges from
 $\frac{1}{4}$ " to 4" Inclusive



Quenching operation
in 2,500 ton press



Checking flatness
in straightening press



Torch cutting
on radial machine

Edge
of

ARMOR PLATE *for Ordnance*

We can save you time and money!

Our group of fully integrated subcontracting plants is equipped, staffed and prepared to furnish the armor plate you need, when and where you need it.

We can serve your every requirement—whether it be for large or small parts in flat, blanked or formed shapes, fully machined or even subassembled. We have the experience, the facilities and the flow of work to handle critical-specification production to your over-all advantage.

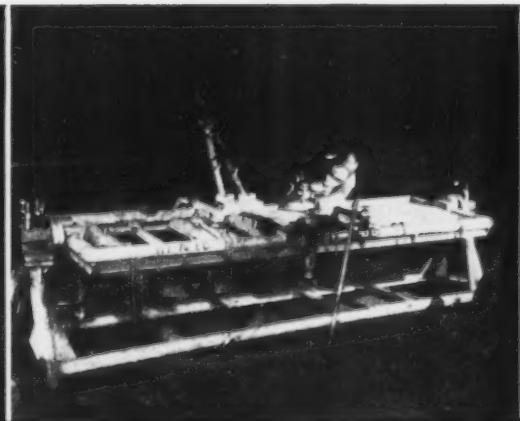
We will engineer the parts for the utmost economy, design the tooling, procure the material, inspect production all along the line and expedite delivery to meet your schedules. Best of all we are ready *now* to serve you. Write, wire or phone us today.

Standard Steel Spring Company

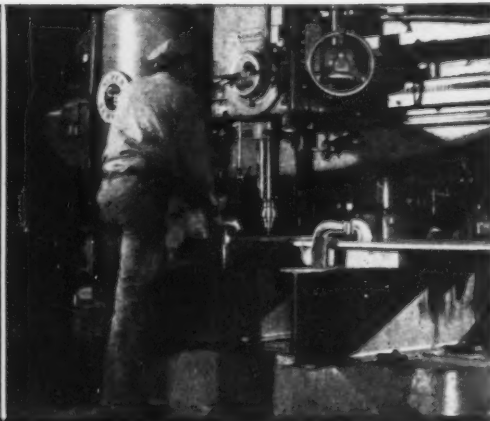
ARMOR PLATE DIVISION • PENOBSCOT BLDG. • DETROIT, MICHIGAN



Edge preparation
of armor plate



Welded fabrication
of subassemblies



Machining to
customers' specifications

A FAMOUS Name in Pumps Specifies a FAMOUS Name in Materials...

MEEHANITE[®] METAL

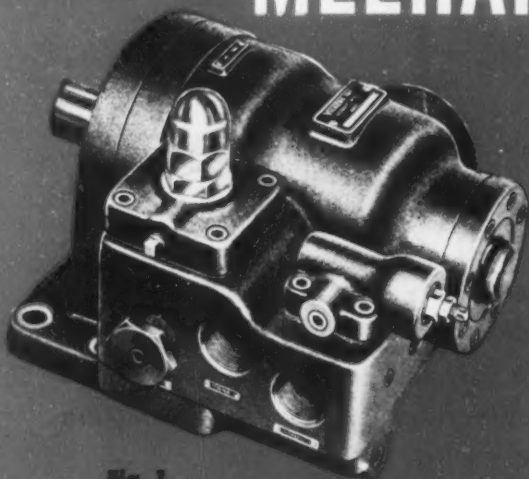


Fig. 1



Fig. 2

NO one familiar with industrial products will deny that Vickers, Inc., Detroit, Mich. is truly a famous name in pumps and all types of hydraulic equipment.

Among the many important types of pumps produced by Vickers is the combination Vane-Type Pump (Fig. 1). In this high pressure unit designed for compactness for successful operation in limited space it is obvious that the housing or body (Fig. 2) would have to be produced in a metal which would provide regularly and dependably pressure tightness, high tensile strength, uniformity, freedom from defects and good machinability. It is for these reasons that Vickers regularly specify Meehanite castings.

The name Meehanite Metal has also earned itself fame among design engineers, production executives, management and purchasing officers who concern themselves with the selection, specification and procurement of component parts and materials requiring the maximum, both property and quality-wise.

Whether your castings require density and pressure tightness; or high tensile strength; or heat treatability for toughness and wear resistance; investigate the wide range of materials available in Meehanite castings.

Remember that Meehanite "Bridges the Gap" between cast iron and steel!



Take YOUR Casting Problem To A MEEHANITE FOUNDRY

American Brake Shoe Co.	Mahwah, New Jersey
The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington, New Jersey
E. W. Bliss Co.	Hastings, Mich. and Toledo, O.
Builders Iron Foundry	Providence, Rhode Island
Compton Foundry	Compton, Calif.
Continental Gin Co.	Birmingham, Alabama
Crawford & Doherty Foundry Co.	Portland, Oregon
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio and Grove City, Pa.
Empire Pattern & Foundry Co.	Tulsa, Oklahoma
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Hardinge Company, Inc.	New York, New York
Hardinge Manufacturing Co.	York, Pennsylvania
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Kanawha Manufacturing Co.	Charleston, West Virginia
Lincoln Foundry Corp.	Los Angeles, California
E. Long Ltd.	Orillia, Ontario
Otis Elevator Co., Ltd.	Hamilton, Ontario
The Henry Perkins Co.	Bridgewater, Massachusetts
Pahlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn. Mfg. Co.	Dover, Ohio
Smith Industries, Inc.	Indianapolis, Ind.
Standard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Warren Casting & Pipe Corporation	Phillipsburg, New Jersey

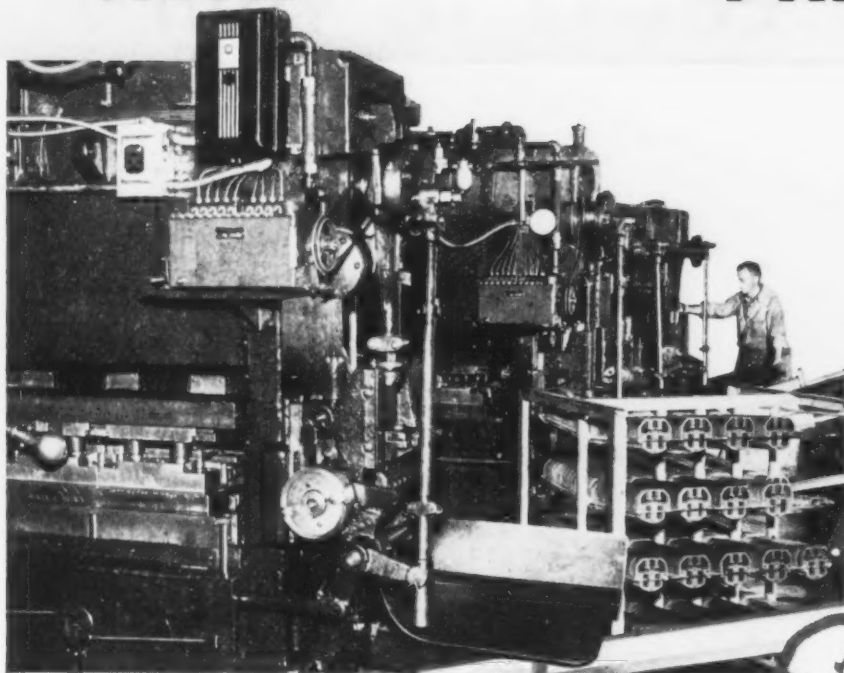
"This advertisement sponsored by foundries listed above."

MEEHANITE[®]

NEW ROCHELLE, N. Y.

THE IRON AGE

The trend is to more stampings WITH PRESSES...



At Westinghouse Meter Division, Newark, N. J., Bliss Automatic Lamination line of four No. 645 High-Production Presses, operating at speeds in excess of 200 strokes per minute, steps up meter lamination production.

Westinghouse gets 800 laminations a minute from 4 BLISS Automatic Presses

To keep pace with stepped-up meter production, Westinghouse relies on a battery of four Bliss High-Production Presses for lamination stampings.

Production is fully automatic: 0.017 in. steel feeds from a Bliss-built coil cradle, through a double-roll feed into a six-station die. The stampings are stacked; the scrap is pulled through and trimmed...all at a rate of 200 strokes per minute.

These Bliss No. 645 Presses are but four of the 80 Bliss presses on the job at Westinghouse. That's because Bliss builds the most complete range of pressed-metal machinery available anywhere.

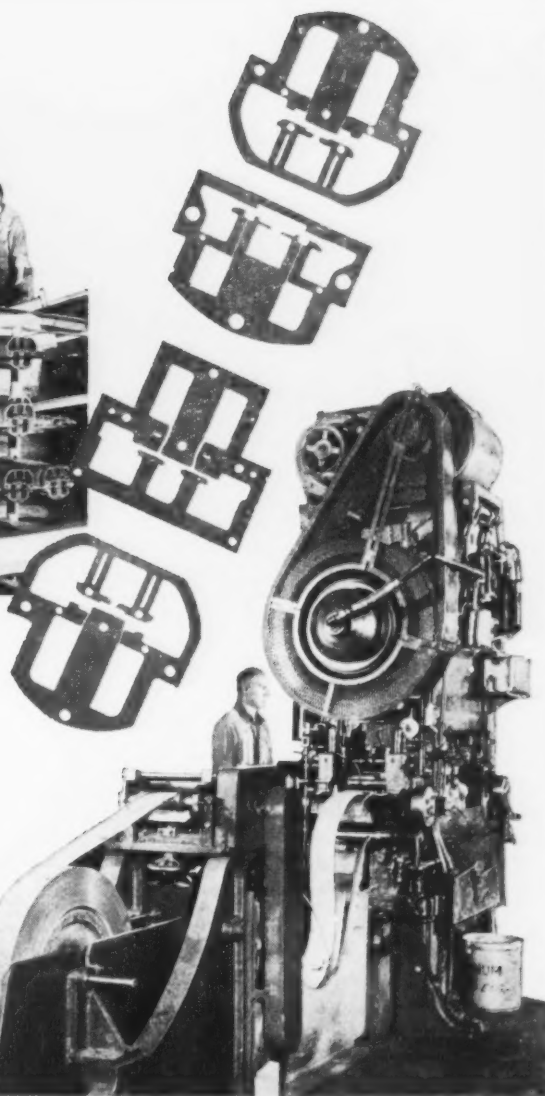
E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada. West Coast Representatives: Moore Machinery Company, Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in U.S. cities and throughout the world.



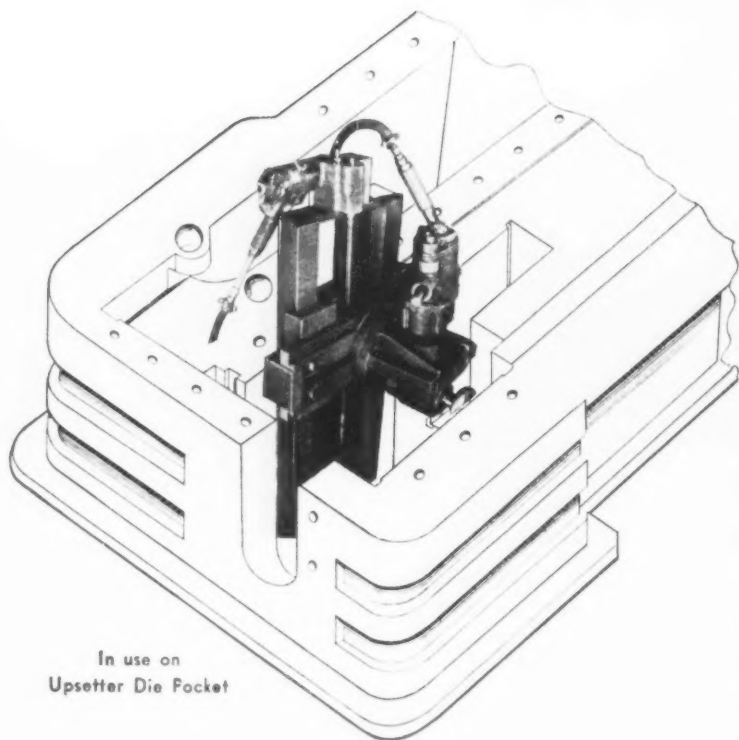
This completely automatic production unit includes coil cradle, roll straightener, double-roll feed, high-production shear and scrap press. For details on Bliss presses, write for "The Dominant Factor."

BLISS

on your press is more than
a name...it's a guarantee!

At Last . . .

THE MILLING MACHINE THAT COMES TO YOU!



In use on
Upsetter Die Pocket

CUT DOWN-TIME TO A MINIMUM
WITH THIS *PORTABLE* WONDER!

You don't have to remove bulky machines from their foundations and ship them back to the factory to refinish worn die pockets—the *Portable Milling Machine*, the *milling machine that comes to you*, will do the job on the spot!

This means a few *hours* of down-time, instead of *days*, plus a tremendous savings in labor and money. There are no removal problems—no shipping problems.

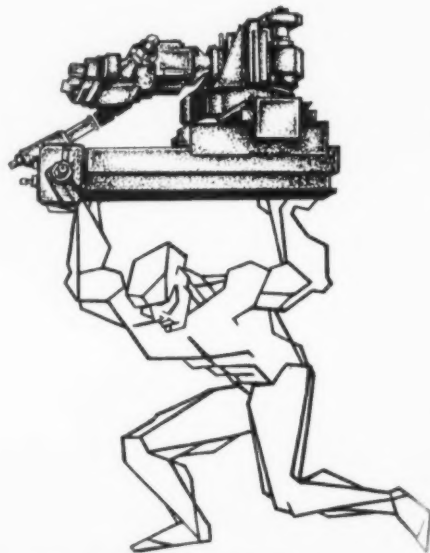
The tremendous response from the Forging and Rolling Mill industries to this machine confirms its practical adaptability for use on worn surfaces of heavy-to-move equipment, to the most exacting tolerances.

When your forgings lose accuracies, due to worn die surfaces, the *Portable Milling Machine* steps in to remedy your troubles with a minimum of down-time. This *portable* machine, as part of your maintenance equipment, will cut your overhead and labor cost to an absolute minimum and increase your average job profit tremendously.

With this machine, the face, front and seat of upsetters can all be refinished with one setting. Hammer bases are easily refinished with this *portable* machine. Surfaces at 90 degree angles from each other may be refinished without moving the machine. Refinishing rolling mill columns is no problem with the *Portable Milling Machine*. Compact and sturdy, it can be used in limited spaces without chatter.

As part of your maintenance equipment, the use of the *Portable Milling Machine* on just one major breakdown in your plant will definitely save more money for you than its actual purchase cost.

For further information, write or phone:



ATLAS PORTABLE MACHINE SALES CORP.

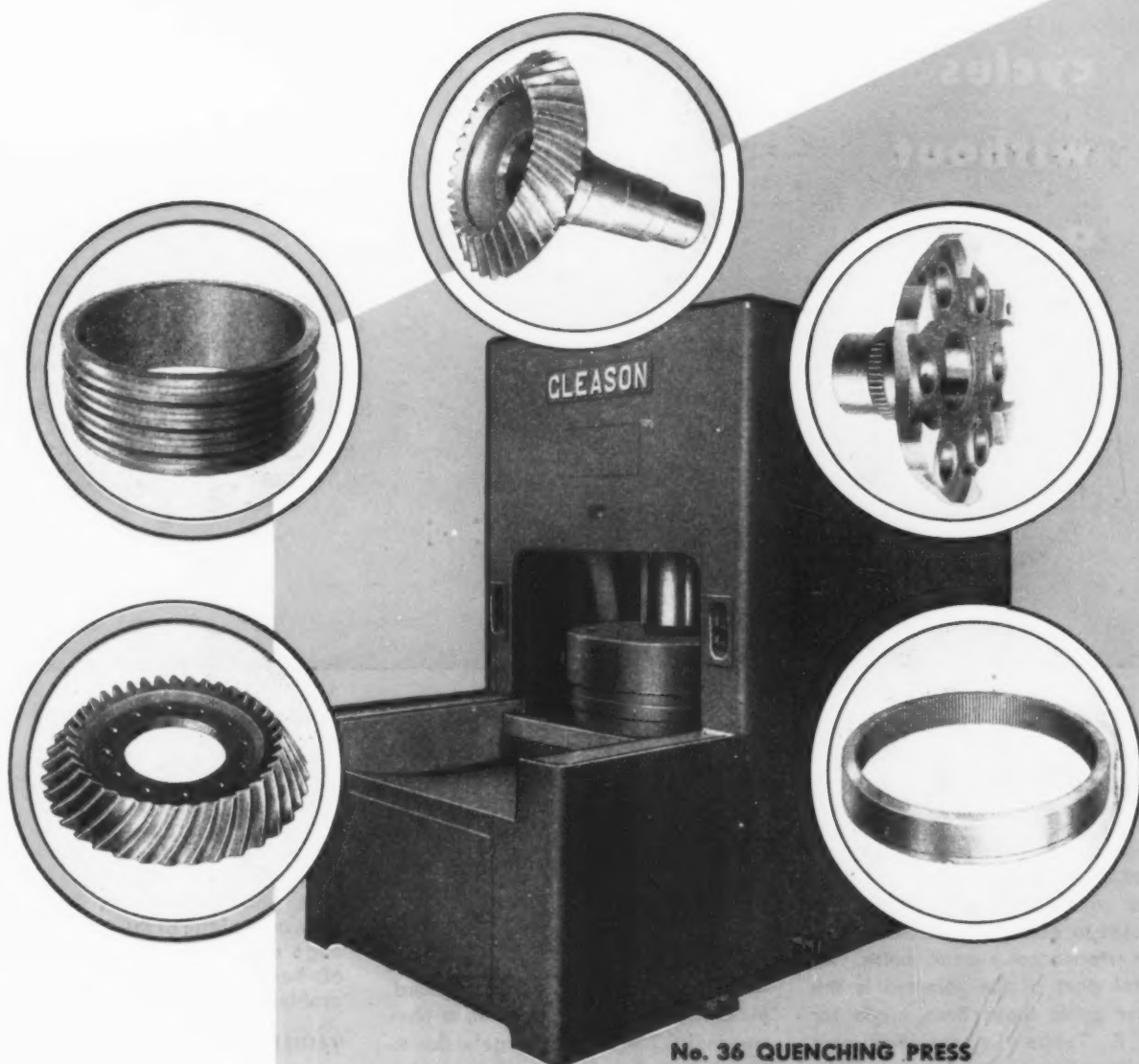
1351 Porter St.

Detroit 26, Michigan

Phone: WOODWARD 2-1134

DIE QUENCH

parts of any shape



No. 36 QUENCHING PRESS

Use Gleason quenching presses and dies whenever you want hardening without distortion. The parts shown here represent only a few of the many types which are successfully die quenched, including cams, discs, gears and bearing races, as well as non-symmetrical pieces.

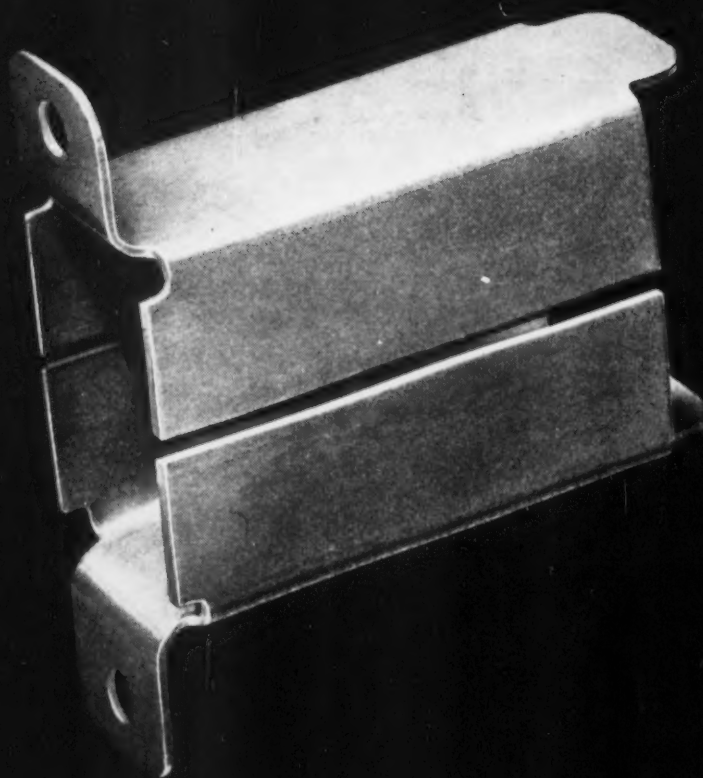
The many advantages of die quenching are now extended over a wide size range by three new-style Gleason presses, the Nos. 16, 26 and 36. Send us prints of your parts which present distortion difficulties in hardening. We will be pleased to show how the correct Gleason press and die equipment will solve the problem.



GLEASON WORKS

1000 UNIVERSITY AVENUE • ROCHESTER 3, NEW YORK

**20 million
cycles
without
a
solenoid
breakdown!**



IT'S MADE OF **BERYLCO** BERYLLIUM COPPER

For safeguarding lives and property, brakes on a hoist are as essential as brakes on a car. Yale & Towne uses solenoids to actuate the brakes of its high-performance electric hoists. An integral part of the solenoid is the plunger guide shown here, made for Yale & Towne by the Instrument Specialties Co.

The plunger is made of laminated silicon steel and tends to exert a filing action on the guide, which is not lubricated. Under severe conditions, the plunger operates at 400 cycles per hour. Other materials tried in this application wore through, stuck, caused downtime and

high maintenance costs. Stainless steel, for example, had a life of 250,000 cycles, phosphor bronze a life of 1 million to 2 million. Berylco was still going strong at 20 million cycles, at which point the test was discontinued. Maintenance costs dropped to a phenomenal 0.2% a year, largely due to the use of beryllium copper... and, of course, downtime was practically eliminated.

Resistance to wear is only one of the many outstanding properties of versatile **BERYLCO** beryllium copper. Others—such as high conductivity, elasticity and strength—can be obtained alone

or in combination, depending upon the alloy selected. It will pay you to investigate what Berylco can do for you. Take advantage of the technical knowledge of the world's largest producer of beryllium copper. Blueprint your problem.

VALUABLE ENGINEERING INFORMATION on Berylco beryllium copper is compiled in a series of monthly technical bulletins. To receive your copy regularly, write on your business letterhead.

SEE US AT BOOTH 1539

NATIONAL METAL EXPOSITION

PHILADELPHIA

October 20-24



THE BERYLLIUM CORPORATION

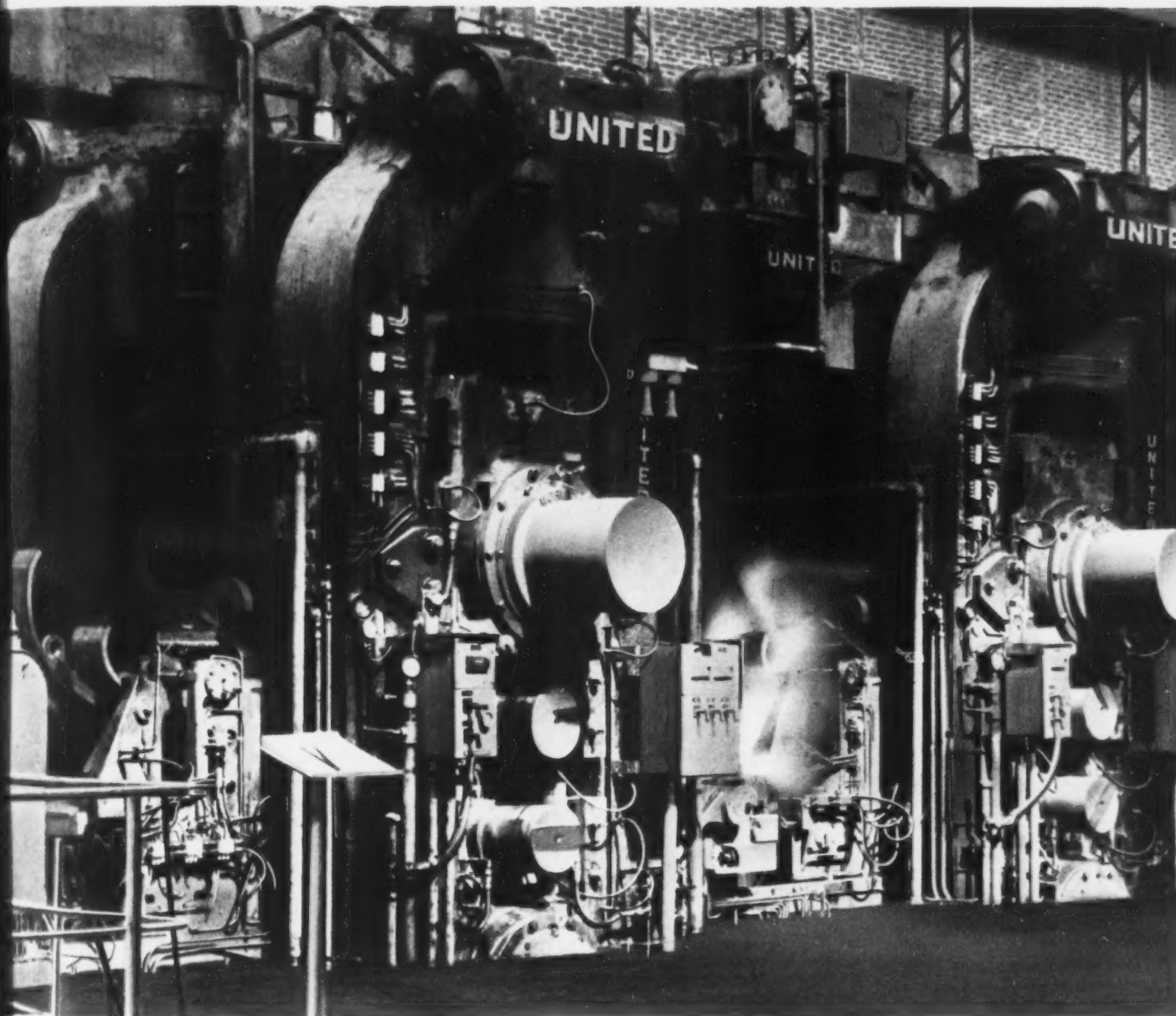
DEPT. 1F, READING 1, PENNSYLVANIA

New York • Springfield, Mass. • Cleveland • Dayton • Detroit • Chicago • Minneapolis • St. Louis • Seattle • San Francisco • Los Angeles

Representatives in principal world-trade centers

UNITED

4-HIGH 6-STAND CONTINUOUS HOT MILL



UNITED

ENGINEERING AND FOUNDRY

COMPANY

PITTSBURGH, PENNSYLVANIA

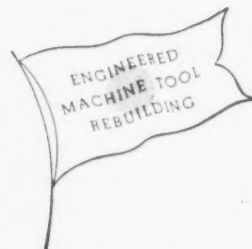


Plants at: PITTSBURGH • VANDERGRIFT • NEW CASTLE
YOUNGSTOWN • CANTON

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
LOBDELL UNITED COMPANY, WILMINGTON, DELAWARE
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

*Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill
Rolls, Auxiliary Mill and Processing Equipment, Presses and other
Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel
Castings, and Weldments.*

"Life Extension Institute" for Your Machine Tools



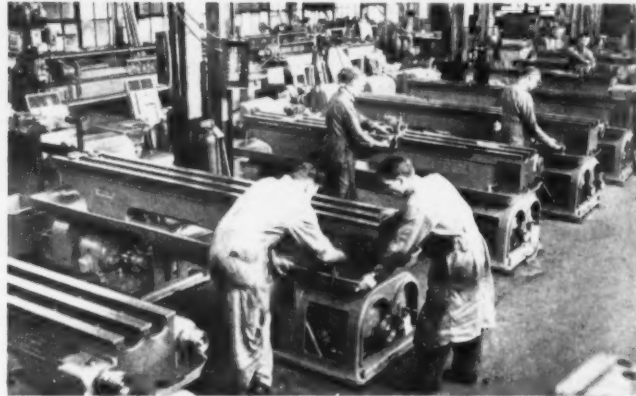
Speed was the problem here. As part of the Government machine tool re-activation program, Simmons has rebuilt over 400 machines. Shown in this bay (fore) are automatic screw machines, deep-hole drillers and various special tools. Despite this program, Simmons was able to continue its rebuilding for industry—thanks to its 120,000 square feet of plant capacity and diversified equipment.



Alignment of head and tail stock is part of the final test of this Landis grinder.



Sand blast facilities are maintained at Simmons to clean cast parts, remove inclusions.

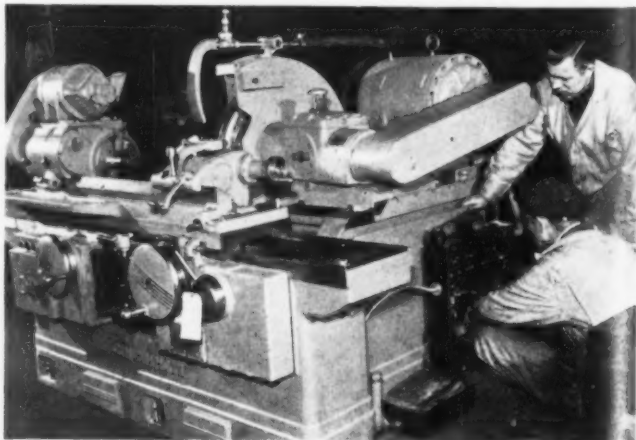


Modernizing: To adapt these deep-hole drillers for carbide tooling, speed was doubled from 1500 to 3000 rpm; cooling system pressure was increased; heavier electrical equipment installed.

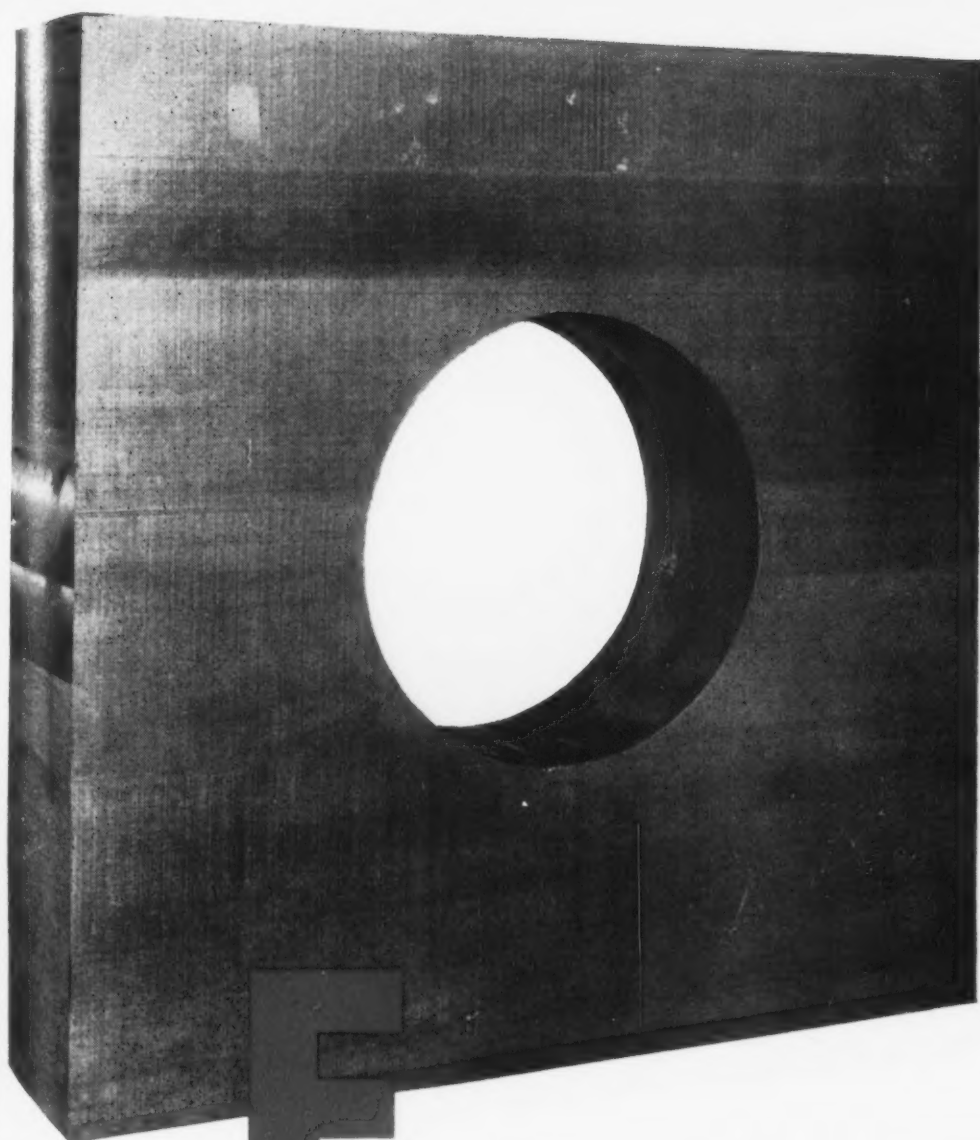
Rebuilding is the fastest way to get machine tools *today*. You will find that there are no long waits for delivery. *Engineered Rebuilding* guarantees user satisfaction. If you'd like to learn more about it, write for our quarterly, **THE SIMMONS WAY.**

SIMMONS MACHINE TOOL CORPORATION
1721 North Broadway, Albany 1, N. Y.

**SIMMONS GIVES
USED MACHINE TOOLS
A NEW LEASE ON LIFE**



Checking electrical systems is an important part of Simmons *Engineered Rebuilding*. Here, two technicians check a control panel on a rebuilt Cincinnati grinder prior to inspection.



Forgings by FINKL

... it's as simple as that to specify the highest quality forgings obtainable today. Quality based on **73 YEARS** of forging experience ... **73 YEARS** of supplying the needs and meeting the demands of forging users large and small.

Between the ingot and you are Finkl craftsmen, employing the most modern equipment to shape, heat treat, metallurgically test, and rough or finish machine your forging ... *between the ingot and you* are 73 years of knowing what to do to make that forging the finest you can get.

All this knowledge is available to you through Finkl Sales Engineers who will gladly offer their services when you want to talk forgings. *Call or write—*



MANUFACTURERS OF THE LARGEST FORGINGS IN THE MIDDLE WEST

A. Finkl & Sons Co.

2011 SOUTHPORT AVENUE • CHICAGO 14

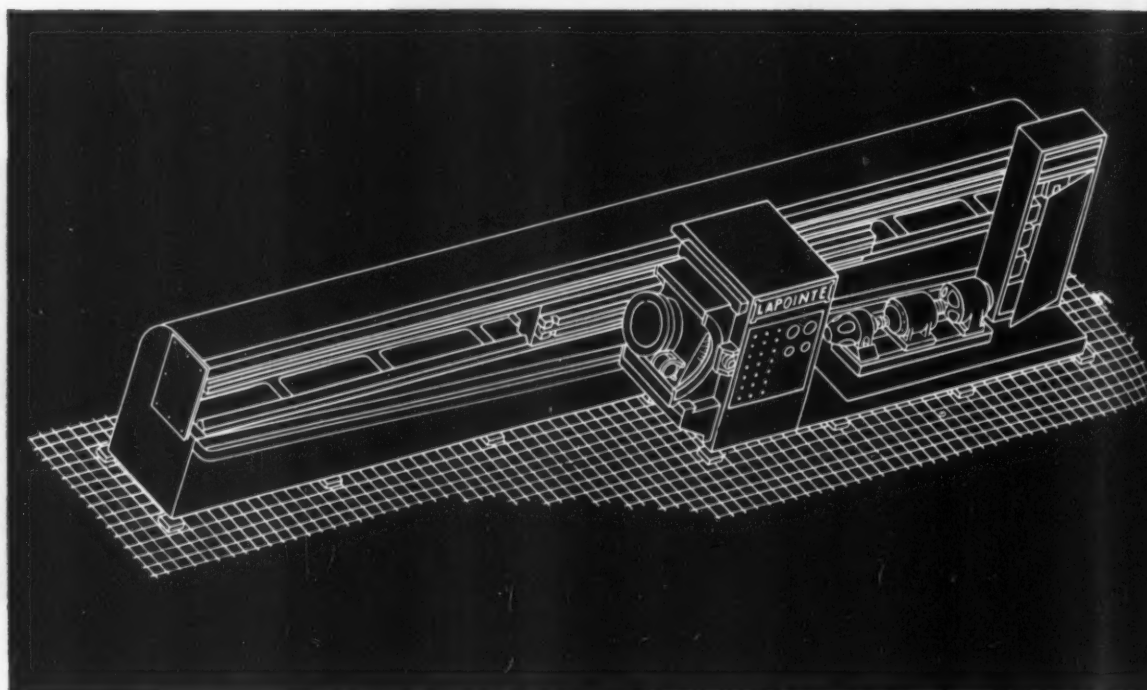
DIE BLOCKS & INSERTS • PISTON RODS & RAMS • SOW BLOCKS • CRANKSHAFTS

October 9, 1952

161

LAPOINTE breaks with tradition . . .

offers tomorrow's **BROACHING**



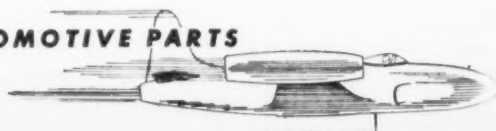
capable of **BROACHING SPEEDS**
in excess of **150 fpm!**

Faster than ever before, this DUAL SPEED Lapointe Broaching Machine is available with strokes ranging from 66 inches to 200 inches. All sliding members are lined with natural phenolic plates (another exclusive Lapointe feature) and slide on heat treated meehanite ways. Clamping fixtures operate on hydraulic power.

Rugged, heavy, and rigid, this machine can be equipped with drives up to 200 hp for smooth, powerful high-speed broaching. It embodies the capability, flexibility, simplicity and "guts" that no previously-designed broaching machine ever has had . . . and the maintenance factor is almost negligible.

In short, this machine represents exactly what industry has come to expect from LAPOINTE, the world's pioneer in the art of broaching.

FASTER BROACHING OF JET ENGINE PARTS AND AUTOMOTIVE PARTS



...and, years ahead of time,

SPEED today!

50 YEARS IN BROACHING!
We're the oldest in the world.
1902 • GOLDEN ANNIVERSARY • 1952

Full information about this machine will be
given if you ask for literature on the **SRHE-9**



View of machine during assembly

THE **LAPORTE** MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS • U. S. A.
Branch Factory: Watford, Herts., England

HUDSON
LAPORTE
MADE

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

This new
LAPORTE Electric Drive

SURFACE BROACHING MACHINE

removes the largest amount of material in
the shortest possible time, due to its
remarkable broaching speed of 150 fpm
— and more!

No longer something to hope for in the future,
this new machine has already completely
proven itself... several have been in service
for some time and are performing production
miracles in nationally known plants.

DUAL SPEED gives great flexibility!

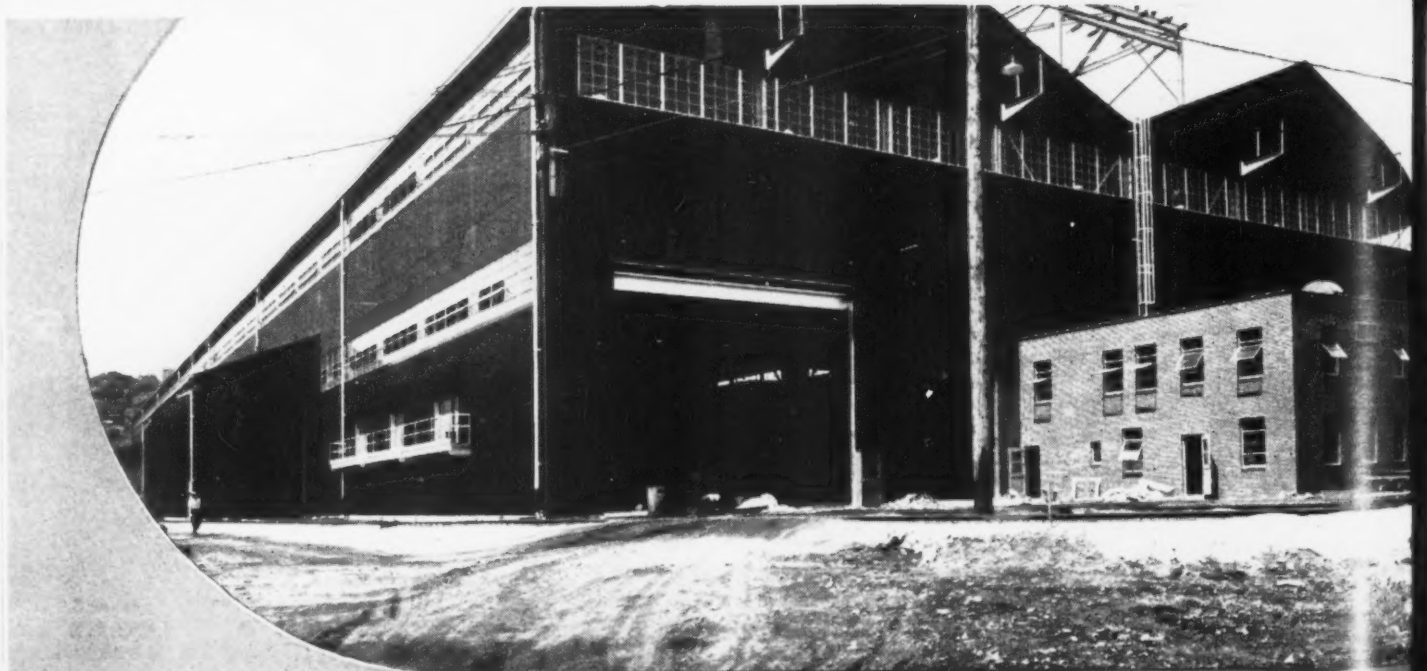
An exclusive feature is the **DUAL SPEED**
(patent pending), which makes it possible
to broach at a certain predetermined speed
for any part of the stroke,
and at any other speed for the remainder
of the stroke.

This opportunity to combine roughing and
finishing operations in the same stroke indicates
the machine's flexibility and is the reason
why this newest Laporte machine is so
useful for the broaching of certain jet engine
parts and automotive parts.

With this outstanding development in
broaching — and others to come — it is well
to remember now, more than ever, that
Laporte can accept responsibility for the
complete job — broaching machines, broaching
tools, and fixtures.

*Engineers
and
constructors*

SWINDELL

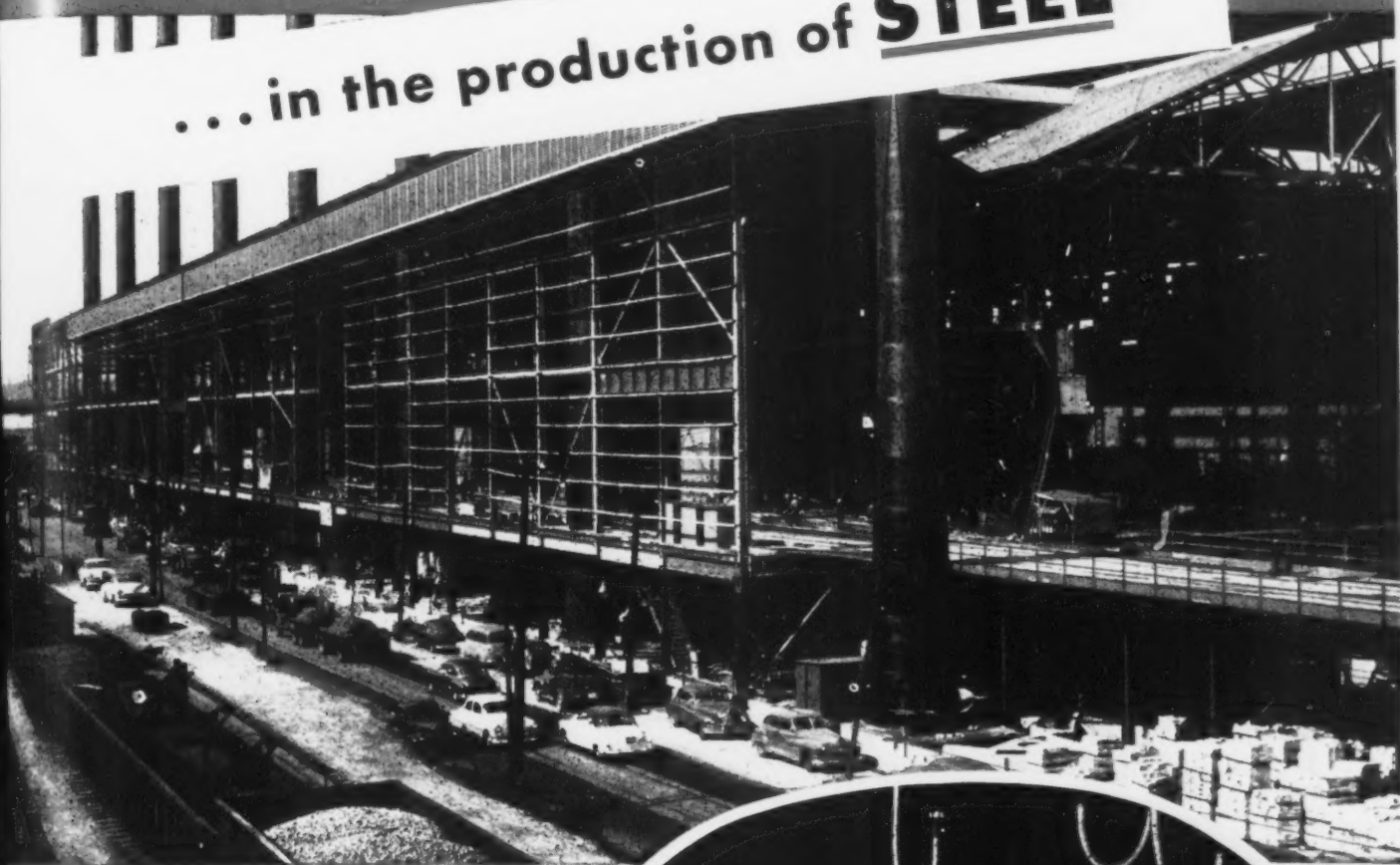


The e
faciliti
a ma
Dressle
constr
naces
shop (C
and m
gigant
in all
Dressl
capaci
the jo
coming

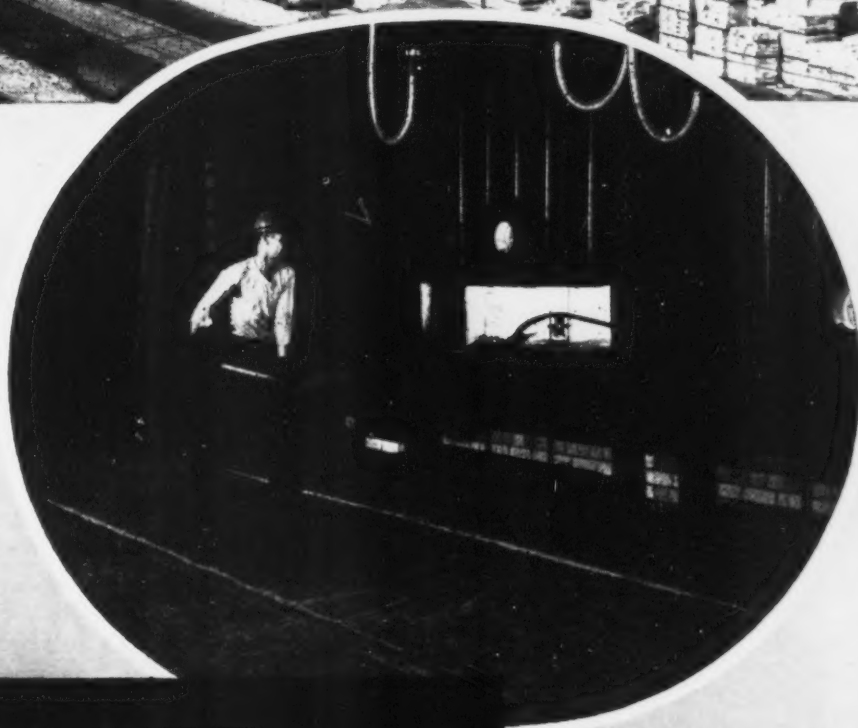
THE WORLD'S LARGEST AND MOST ADVANCED MANUFACTURER OF STEEL

DRESSLER

...in the production of **STEEL**



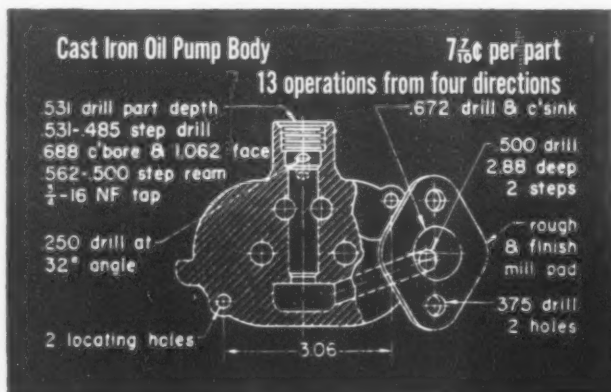
The engineering of steel-making facilities "from the ground up" is a major activity of Swindell-Dressler. • Whether the task is the construction of buildings and furnaces for a new electric melting shop (at left), or the engineering and management supervision of a gigantic open-hearth development in all its ramifications, Swindell-Dressler has the resources, the capacity and the experience for the job. • Let us discuss your coming requirements.



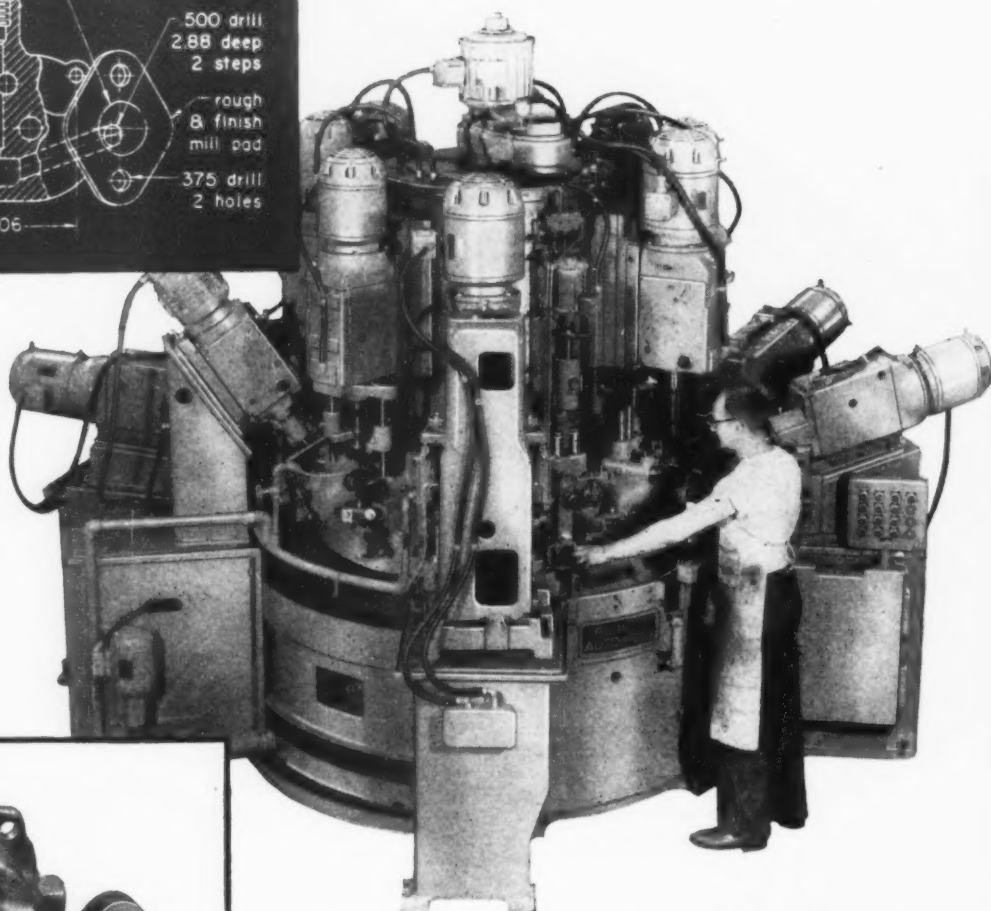
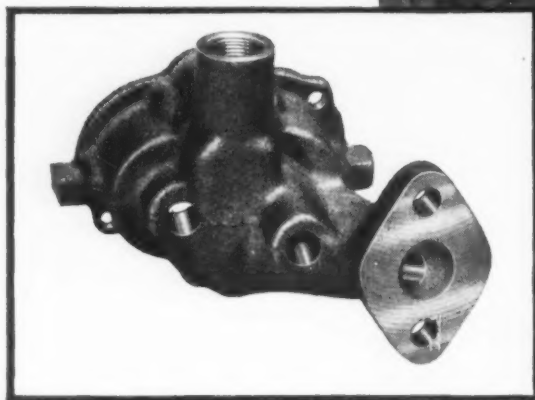
SWINDELL-DRESSLER Corporation

PITTSBURGH 30, PENNA.

More parts per man-hour soon



**13 Operations
 from 4 Directions
 7 $\frac{7}{10}$ ¢ per part**



Production is 200 parts
 per hour gross.

KINGSBURY Special Purpose Drilling and Tapping Machine Combines Operations to Save Money

Dear Sir:

Look at this Cast Iron Oil Pump Body. How many machines would you need to do all this work? One central column Kingsbury with an 84-inch base and 60-inch index table does all 13 operations. It has ten stations with 11 drilling units and one tapping unit. One unit has a two-spindle auxiliary head. Six

units are mounted vertically. The other six units are mounted on knees bolted to the base and these are mounted at three different angles to the work.

The longest single operation governs the time required to finish one piece. By splitting a long operation into two short ones, using two units, the time cycle can be cut. Thus the .500 hole is drilled in two steps.

Bushing carriers guide all tools except the tap, the milling cutters and the second .500 drill. This means accurate alignment and precise positioning from the locating point. An interesting operation is the finish milling operation which has a special mechanism that draws the cutter away from the work on the up stroke. No tool marks to mar the finish.

pay for a KINGSBURY

Designed to Produce One Part

Kingsbury Machines are designed for low production costs on long runs of parts requiring several operations. The more operations at one setup, the greater are the savings possible. But these machines pay for themselves on simple work too. For example, the Steel Bearing Race shown at the lower left requires only a few operations. The Kingsbury machine soon paid for itself with more parts per man-hour at greater accuracy.

Each machine is equipped with $\frac{1}{2}$ to 5 hp automatic units. The number of units and the type of work holders depend on the work to be done. The work table may be stationary or it may be indexed. Your Kingsbury will come to you ready to run.

How Unit Costs were Figured

Each unit cost shown is the sum of these two figures —
The unit cost of the man:

$$\frac{\text{average U. S. hourly rate}}{\text{hourly gross} \times 80\% \text{ efficiency}}$$

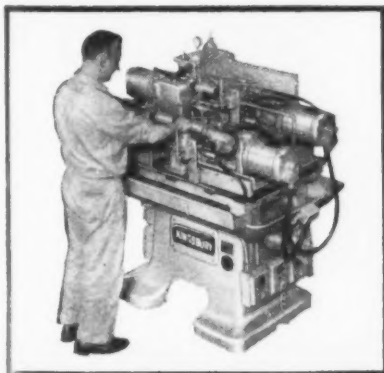
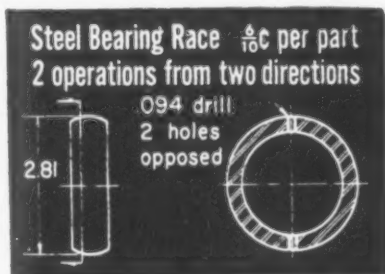
The unit cost of the machine:

$$\frac{\text{price of tooled machine}}{\text{output in 6000 hrs. @ 80\% efficiency}}$$

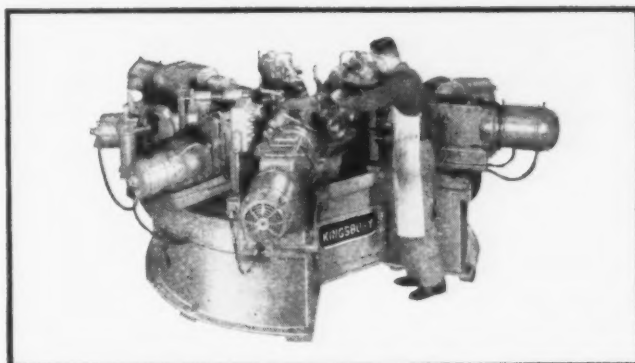
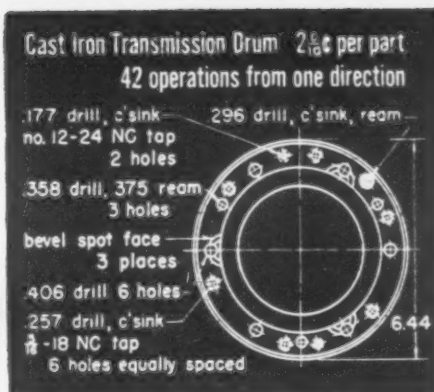
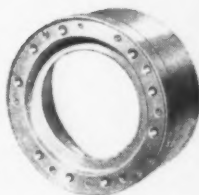
The costs include just the man and the machine — no power or overhead. As to the 6000 hours, that's about three years for one shift — one year for three shifts.

If you want more information just drop us a line.

Sincerely,
Kingsbury Machine Tool Corp.
99 Laurel St., Keene, N. H.



Production is 680 parts per hour gross.



Production is 330 parts per hour gross.

Cast Iron Transmission Drum

42 Operations 2 1/8¢ per part

Note the number of operations. (42 spindles are required, all working at once.) This Kingsbury machine has a 100-inch base and 30-inch index table. There are seven drilling units and one tapping unit. All are mounted horizontally and use auxiliary heads with from three to nine spindles each. Bushing carriers guide all tools but the taps. Each fixture is automatically unclamped as it indexes to the unloading station.

Steel Bearing Race

2 Operations—from 2 Directions 6/10¢ per part



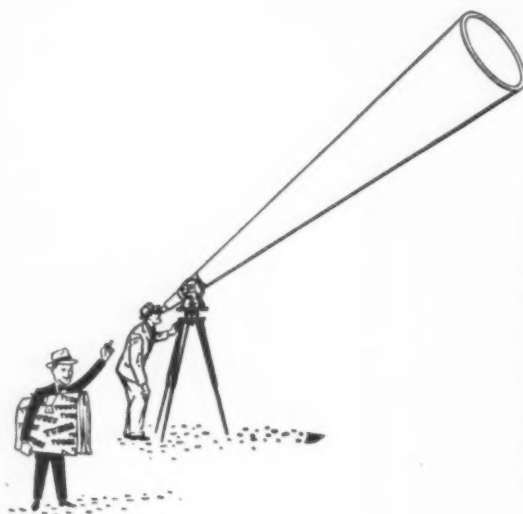
The machine on the left looks simple, doesn't it? It is, but it really produces. The operator of this double end machine puts in one piece and trips a lever. Air cylinders clamp the work and opposed units drill .094. While they are

operating he loads another part into the rear fixture. With two fixtures, the operator can load one while the other is working — no waiting for operations to be completed. There's no indexing, just a 46 by 24 inch rectangular table.

KINGSBURY

AUTOMATIC DRILLING
& TAPPING MACHINES
for Low-Cost High Production

take a
CLOSER LOOK
at...



Headquarters for first-hand
information on PRESSURE and
MECHANICAL TUBING produced
to meet your production
problems.

for:

- 1 Seamless and welded Tubing.
- 2 Hot-finished, hot-rolled, cold-drawn or cold-rolled, and "Roto-Rocked" tubing.
- 3 Wide choice of Carbon, Alloy, and Stainless grades.
- 4 Sizes up to 9 $\frac{3}{8}$ " OD in full range of wall thicknesses.
- 5 Open-hearth and electric-furnace steels, including aircraft and magnaflux qualities.
- 6 Unannealed, annealed, tempered, normalized, or otherwise heat-treated conditions, as required.
- 7 Wide choice of surface finishes—as rolled, as drawn, as welded, flash removed, turned, scale-free, and polished.
- 8 Round, square, rectangular, oval, and other shapes.
- 9 Specialty fabrication such as upsetting, expanding, bending, safe-ending, and machining.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION

General Offices and Plants

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing
Sales Offices: Beaver Falls, Pa. • Boston 16, Mass.
Chicago 3, Ill. • Cleveland 14, Ohio • Denver 1, Colo.
Detroit 26, Mich. • Houston 2, Texas
Los Angeles 15, Cal. • New York 16, N. Y.
Philadelphia 2, Pa. • St. Louis 1, Mo.
San Francisco 3, Cal. • Syracuse 2, N. Y.
Toronto, Ontario • Tulsa 3, Okla.



TA-1604

For better High Pressure Control Mechanisms




EATON Permanent Mold Gray Iron Castings



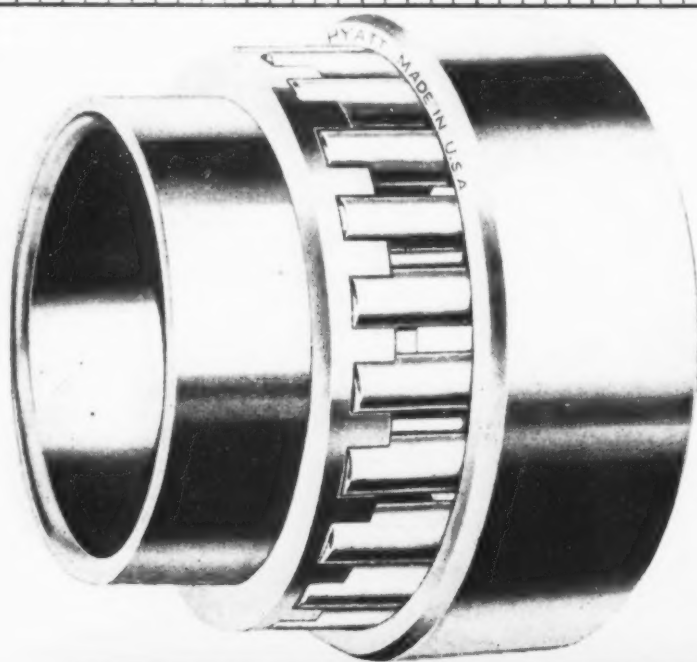
Send for your copy of
the illustrated booklet, "A
Picture Tour of the Eaton
Permanent Mold Foundry."

Free machinability
Dense, homogeneous structure
Freedom from leakage under pressure
Machines to high, mirror-like finish
Properly annealed; no growth or distortion after machining

EATON MANUFACTURING COMPANY
CLEVELAND, OHIO
FOUNDRY DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

 **PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet
Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings
Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

October 9, 1952



Are you acquainted with this type of HYATT bearing?

Here is the Industrial Inch 70,000 Series three-part Hyatt Roller Bearing designed for large diameter, slow speed shafts in heavy equipment where fractional dimensions are the rule.

The races are made from alloy steel forgings which are heat-treated to obtain the greatest possible strength and durability, then finish-ground to close tolerances. The roller assembly is made up of two bronze end rings drilled to pocket the roller ends and riveted to steel spacing bars.

Built to fulfill specific requirements, this Industrial Inch Bearing, like all the other Hyatt Bearings employing solid or wound rollers, is proving most satisfactory for its particular application.

* * *

Write for Catalog No. 150 for further details in the Inch Series and all the other popular Hyatts for all your bearing needs. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

**PERFORMANCE
REPORT
from Wheeling Steel**

NO BUMPING OR JERKING!

50% FASTER!

FASTER TAPPING OF HEATS!

**REDUCED
TRACK MAINTENANCE!**

95% AVAILABILITY!

**APPRECIABLE
SAVINGS!**

50% FASTER DELIVERY TO MOLD YARD AND POURING TABLE

Typical of the exceptional results obtained by most Baldwin users is the experience of the Wheeling Steel Corporation.

At Wheeling, two Baldwin locomotives are in service for 24 hours each day, seven days a week, handling a full heat of ingots up an almost one percent grade and through sharp turnouts *without bumping or jerking*.

Since replacing with these diesels, Wheeling reports they have speeded up delivery of molds to mold yard and pouring table by 50%. And deliveries of ingots to the soaking pits has also shown a marked improvement. Pit operation, too, has been helped, making for faster tapping of heats and increases in tonnage.

And Wheeling attributes this performance almost entirely to use of these Baldwin diesel-electric locomotives.

What's more, their track maintenance has been reduced to a minimum; derailments have been practically eliminated; they are not plagued by smoke nuisance nor delayed by taking water, cleaning fire or blowing down. Their Baldwins are available for work 95% of the time.

In addition, they report appreciable savings in fuel and maintenance.

If you would like to know whether you, too, can cut your costs and improve hauling operations with Baldwins, write . . . today! We will be glad to prepare a detailed cost analysis for you.

CHECK BALDWIN'S COMPLETE LINE!

- Diesel-hydraulic Locomotives from 12 to 35 tons.
- Diesel-electric Locomotives from 25 to 177 tons.
- Diesel-mechanical Locomotives in 5 and 8 tons.



BALDWIN-LIMA-HAMILTON

PHILADELPHIA 42, PA. • OFFICES IN PRINCIPAL CITIES



"Specials" are ball bearings which have been custom designed to be "exactly right" for a particular application. Thus, the field for specials ranges from modification of existing standard bearings to complete new bearings of unusual shapes and dimensions. As "specialists in specials," experienced NICE engineers take advantage of every design opportunity to reduce costs without sacrifice of quality and to improve product performance and appearance.

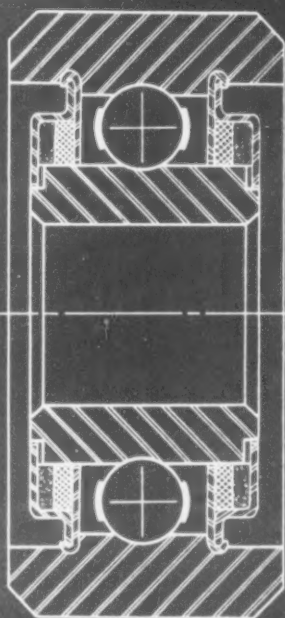
SPECIAL BEARINGS

of unusual shapes
and dimensions

Representative of Nice ingenuity is No. 6866, a cam follower on an agricultural harvester. No. 6866 replaces a precision bearing pressed into a specially machined outer tire . . . and the resulting improvements were:

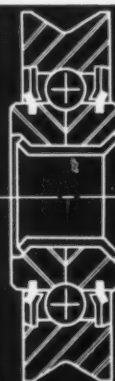
1. LOWER COST (OVER 30% SAVINGS).
2. INCREASED CAPACITY.
3. MORE EFFECTIVE SEAL.
4. PACKAGED INTERCHANGEABLE UNIT.
5. IMPROVED APPEARANCE AND PERFORMANCE.

Characteristic of agricultural machinery, severe dust and dirt problems dictated the need of an efficient and rugged seal. No. 6866 seal has proved to be highly effective and durable.

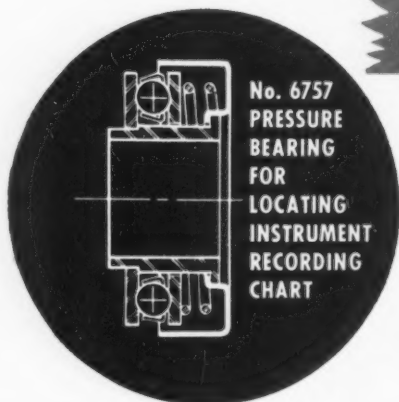


NO. 6866 CAM FOLLOWER

Where new tooling is justified by the quantities involved, specials of this type, where applicable, offer the greatest possibilities for cost savings and product improvement. A few typical application examples are illustrated.



No. 6750
BALING MACHINE
WIRE GUIDE



No. 6757
PRESSURE
BEARING
FOR
LOCATING
INSTRUMENT
RECORDING
CHART

SEMI-PRECISION "SPECIALS"

Many precision bearing applications do not require all of the elements of precision that are normally incorporated in a standard precision unit. For example, if the bearing cone is locked against a step on the shaft, grinding of the bore can be eliminated and will save approximately 10% of the selling price of a 2" OD precision annular bearing. Similarly, if the loads are not severe nor the RPM excessive, polishing of the ball grooves may not be necessary and will reduce the cost about 10%. In a light load application, the outer ring material can be changed to a less expensive steel at a savings of as much as 8% of the selling price.

THE USE OF SEMI-PRECISION BEARINGS, WHERE INDICATED, MAY REFLECT SUBSTANTIAL SAVINGS TO THE MANUFACTURER WHO BUYS BEARINGS IN PRODUCTION QUANTITIES.

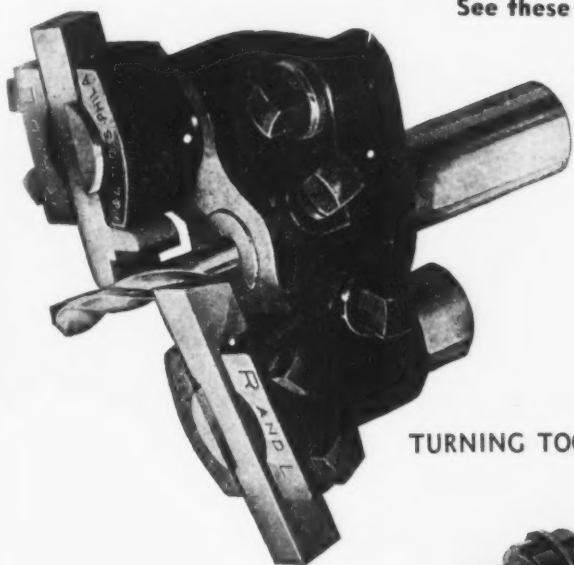


NICE BALL BEARING COMPANY
NICETOWN · PHILADELPHIA · PENNSYLVANIA

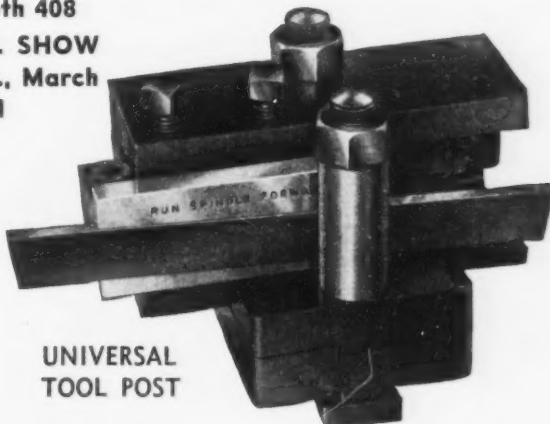
R AND L TOOLS

Manufacturers of Precision
Screw Machine Tools

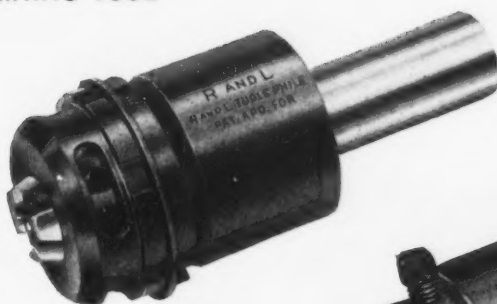
See these tools in Booth 408
ASTE TOOL SHOW
Chicago, Ill., March
17-21



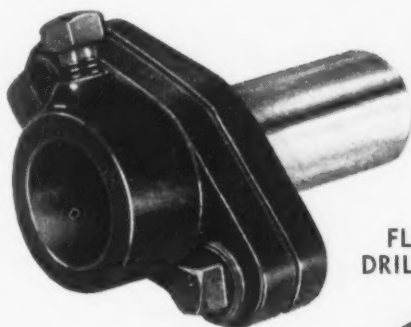
TURNING TOOL



UNIVERSAL
TOOL POST



RELEASING
ACORN DIE HOLDER



FLOATING
DRILL HOLDER



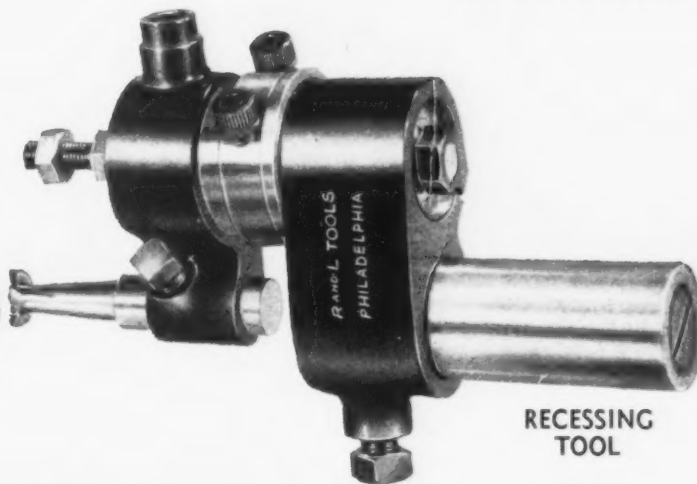
RELEASING
TAP & DIE HOLDER



KNURLING
TOOL



REVOLVING
STOCK STOP



RECESSING
TOOL

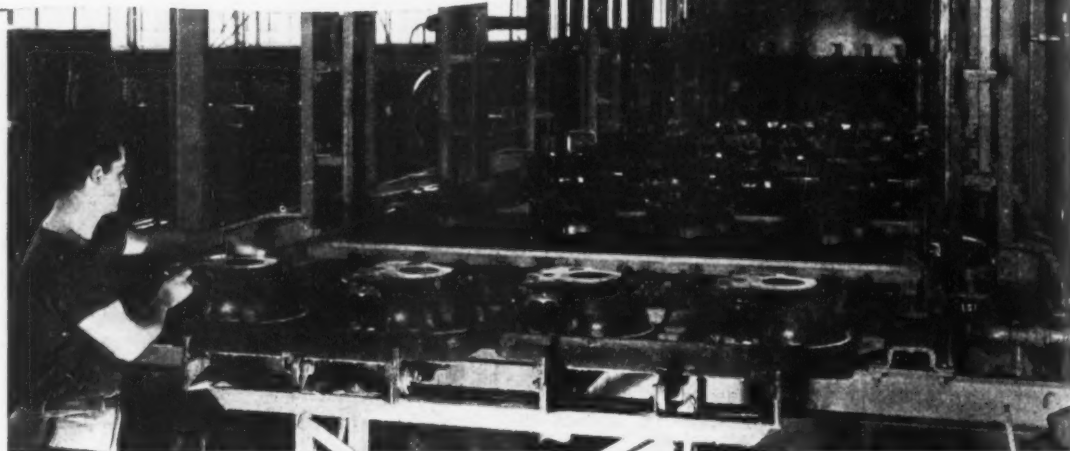
Send for 28 Page Catalog—1

R AND L TOOLS

1825 BRISTOL STREET
PHILADELPHIA 40, PA.

TURNING TOOL — TAP AND DIE HOLDER — UNIVERSAL TOOL POST — TURRET BACKREST HOLDER — CUT-OFF BLADE HOLDER — RECESSING TOOL
RELEASING ACORN DIE HOLDER — REVOLVING STOCK STOP — FLOATING DRILL HOLDER — KNURLING TOOL — CARBIDE AND ROLLER BACKRESTS

Desand-degraphitize castings in 10 minutes with **VIRGO[®] MOLTEN CLEANER**



UNLOADING VIRGO-CLEANED CASTINGS from continuous cleaning line.

HERE ARE THE BENEFITS!

- Longer machine tool life.
- All surface defects show up.
- A cleaner, better product.

With Virgo Molten Cleaner your castings are completely free from sand and graphite before they are machined, giving you greater machine tool life. Any surface defects on castings are shown up, and you can scrap defective castings before they are machined. This same freedom from impurities insures trouble-free operation for your product when it is placed in use.

The process is simple and easy to operate—does not require close supervision. A five-minute immersion of castings in Virgo Molten Cleaner bath at 800° F.

is usually enough to dissolve every trace of sand, and dissolve graphite to satisfactory depth. A water quench removes salt and leaves a protective coating on the castings. (This coating is corrosion-resistant and may be left on if castings are to be stored.) The coating is removed by a three-minute dip in dilute acid. A brief water hosing or rinse completes the job.

You can use the Virgo bath, at higher temperature, to stress relieve while desanding. By combining operations in this way, costly annealing equipment, as well as the additional operation can be eliminated.

For full details and description of this process, write us today. Please use your business letterhead or coupon below.

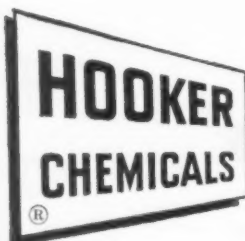
For Fast, Safe, Low-Cost DESCALING—

VIRGO[®] DESCALING SALT

Producers and fabricators of stainless and alloy steels use Virgo Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing. The Hooker Process is backed by 15 years' experience in salt bath descaling and cleaning. Engineering, research and on-site operating assistance are part of our service.

SEND FOR THESE BULLETINS

They tell the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process.



1-1949

From the Salt of the Earth

HOOKER ELECTROCHEMICAL COMPANY

33 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
NEW YORK, N. Y.
WILMINGTON, CALIF.
TACOMA, WASH.
CHICAGO, ILL.

Hooker Electrochemical Company

33 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.

Please send me Bulletins checked: Virgo Descaling Salt ☐
Virgo Molten Cleaner ☐

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

How B&W ALLMUL cuts severe service refractory costs

LEAD DROSS FURNACE

"ALLMUL proves more economical than any refractory tried!"

A plant with several reverberatory type smelting furnaces, used to melt alloys of lead, tin and antimony, carried on an extensive investigation to obtain economical refractory linings. Practically every type of refractory was tried. Side-by-side tests in the same furnace proved the economy of B&W Allmul over all others. Result? Allmul is now standard for these furnaces.

CONTINUOUS WELD PIPE FURNACE

"Three times the life in worst wear areas!"

A large manufacturer was troubled by the short life of kyanite-base refractories in certain areas of his furnace. Then B&W Allmul were installed in the uptake arches, a critical, severe-service area. Result? Allmul lasted three times as long as previously used refractories and has been ordered for general use in all areas of this manufacturer's furnaces of this type.

INDIRECT ARC FURNACE

"All furnaces converted to ALLMUL after comparative tests"

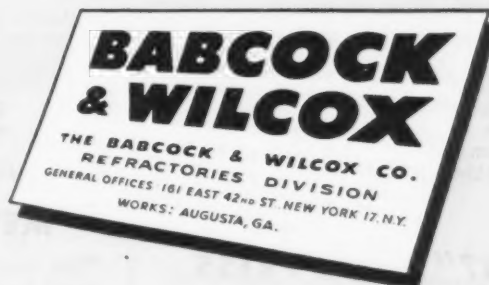
A large company making alloy steel castings has several indirect arc furnaces melting various alloys, with pouring temperatures varying from 2700F to 3100F. With highest temperature alloys, semi-mullite brick burned out in 6 to 10 heats. B&W Allmul, which cost approximately the same, showed no appreciable wear after 20 heats. On alloy steels in general, this customer reports far-less slag formation (an indication of reduced refractory wear) with Allmul than with any other refractory used. Result: All furnaces are being relined with B&W Allmul Firebrick.

ELECTRIC FURNACE ROOF

"ALLMUL lasts 3 to 6 times as long"

In a six-ton electric furnace, handling 15 tons of stainless steel per charge, super duty firebrick had to be replaced every 20 to 40 heats. Pouring temperature of the metal was in excess of 3100F, with higher temperatures attained in the furnace during periods of oxygen introduction. The owner installed B&W Allmul Firebrick, hoping for a life of 80 heats. Allmul in the first roof lasted for 122 heats—42 more than hoped for. The second roof of Allmul went to 131 heats! Result? Further orders for Allmul.

Yes, the facts about B&W Allmul Firebrick speak for themselves. This fused-mullite brick is proving its economy in dozens of severe service applications. The reason? A unique combination of refractory properties—high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F—all resulting in lower furnace costs. Want more data? Write for Bulletin R-29.



B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick
B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment ...
Chemical Recovery Units ... Seamless & Welded Tubes ... Pulverizers ... Fuel Burning Equipment ... Pressure Vessels ... Alloy Castings

LIGHT, VERSATILE, RUGGED DELTA TOOLS

lead new trend in Metalworking

There's a basic change going on in the metalworking industry—a wholesome, profitable change, with the pace increasing daily—as alert shop men discover that on many operations light, rugged, versatile Delta power tools can out-perform and out-produce heavier, costlier installations.

These five potent facts go far toward explaining the economic common sense of this change:

DELTA TOOLS ARE ACCURATE—their accuracy is built in, makes close precision tolerances easy to achieve.

DELTA TOOLS ARE ADAPTABLE—unusually mobile and portable, they can be tooled for a given job, kept in the tool crib, then moved into and out of production lines with no lost time for setting up; can be used for continuous high-production runs of single or multiple operations.

DELTA TOOLS ARE DURABLE—rugged to withstand hard usage . . . precision built and beautifully balanced, they perform most efficiently throughout long, useful lives.

DELTA TOOLS ARE ECONOMICAL—first cost is moderate; and is quickly amortized by low power cost, low maintenance expense, increased output and elimination of bottlenecks and slower methods.

Dollar for dollar, Delta tools deliver more. Here are 5 reasons why:

- 1 Lubricated-for-life ball bearings eliminate lubrication problems.
- 2 Precision bored bearing seats assure accuracy and smooth operation.
- 3 Preloaded bearings provide maximum rigidity and accuracy under load.
- 4 All spindles, arbors and collars are precision ground for accuracy.
- 5 Dynamic balance of rotating parts insures smooth, true performance.

DRILL PRESSES

With Delta Drill Presses, you can work out any set-up to suit your own need—using one spindle or as many as your job requires. Any set-up you want is not merely possible, but is actually very easy—because Delta drill presses have the flexibility to make them fit readily into any multiple spindle set-up. Low in cost, easy to maintain, readily portable, the Delta Drill Press is a good example of fine engineering, rugged construction and compact design.

A 14" DRILL PRESS

Available with either No. 1 Morse taper spindle or ½-inch Jacobs chuck that takes straight shank drills from No. 60 to full ½-inch. In high- or slow-speed models. Capacities up to ½-inch in cast iron; ¾-inch in steel. Quill has 4-inch stroke. Spindles are readily interchangeable—a simple matter to select the right spindle for any job.

B 17" DRILL PRESS

Available with either No. 2 Morse taper spindle or ½-inch Jacobs chuck. In high- or slow-speed models. Capacities up to ¾-inch in cast iron. Quill has 5-inch stroke.

METAL CUTTING

C CUT-OFF MACHINE

Cut steel, aluminum, copper, brass in one fast, easy motion with a Delta Cut-Off Machine. It's easily changed from a non-ferrous to a ferrous cut-off machine by switching from steel blade to abrasive wheel.

D 14" METAL CUTTING BAND SAW

Cuts anything from carbon tool steel to asbestos, in hundreds of applications. Four metal-cutting speeds: 125, 175, 250, 340 f.p.m.—change from metal to wood with just a flip of your finger and simple belt change.

SHAPER

E 7" PRECISION METAL SHAPER

This husky "machine of a thousand uses" is extremely popular in machine shops, tool making and model making shops, schools and experimental departments. "V"-type ways on ram, tool head and front face of main frame insure accuracy and longer life.

FINISHING MACHINES

F DEBURRING Machine

The easy, practical, low-cost way to handle a multitude of metal removal operations. Eliminates bother of "set-up wheels" and dressing of "grinding wheels"—inexpensive, long-wearing abrasive belts are easily replaceable. Much lower in cost than any comparable machine on the market.

G ABRASIVE BELT FINISHING Machine

This 6" belt-type abrasive finishing machine is heavy and husky enough to do dozens of sanding, polishing and finishing operations, yet is portable. Operates vertically or horizontally.

H ABRASIVE DISK FINISHING Machine

This machine is ideal for an accurate, fast finishing job. It can be moved to any place in the shop or on the production line. Abrasive disks can be renewed every few minutes if necessary.

WELDERS

DELTA Combination 5 KVA SPOT and 120 AMP. ARC WELDER

For any shop doing a lot of light duty production spot welding and intermittent arc welding. Unique design, careful engineering and high production methods permit pricing it considerably under two individual welders.

DELTA 5 KVA Automatic SPOT WELDER

Compared to other spot welders, this compact unit is conspicuous for efficiency and low cost. It is extremely simple and easy to operate, and has an unusually wide range of capacity.

GRINDERS

K Toolmaker GRINDER

As a Chip-Breaker Grinder. With uni-vise and coolant attachment, the Toolmaker surface grinder is a precision machine which grinds the chip breaker groove in carbide tipped tools.

As a Tool and Cutter Grinder. With the Toolmaker tool and cutter grinding attachment, it becomes an economical machine for easy sharpening of tools and cutters.

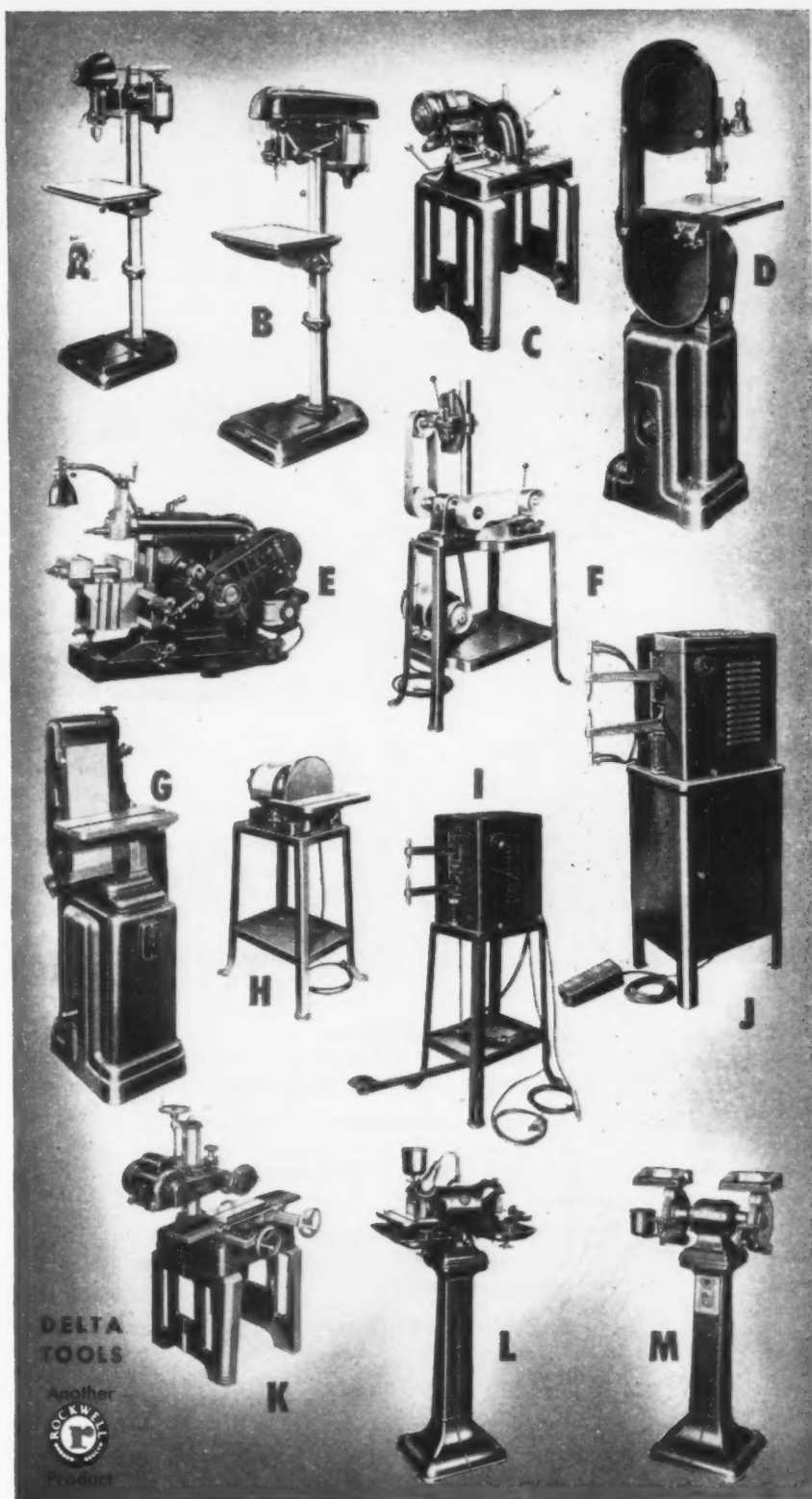
As a Standard Surface Grinder. The basic Delta Toolmaker surface grinder does every type of surface grinding required in the tool room or production shop. It's a big, rugged machine with the massiveness and solidity needed to produce accurate work.

L CARBIDE TOOL GRINDER

Here's the accurate, low cost way to grind your tungsten-carbide tools—the Delta Carbide Tool Grinder. Made in two styles—bench and pedestal—a wide range of motors are available.

M STANDARD TOOL GRINDER

Here's the grinder "that can't forget its goggles." In addition to its unsurpassed safety features, it's a money-saver—sturdy, accurate, highly adaptable, easy to use and low in cost.



There's a Delta Power Tool for Your Job - WOOD OR METAL WORKING 53 MACHINES • 246 MODELS • MORE THAN 1300 ACCESSORIES

**DELTA
MILWAUKEE**

DELTA POWER TOOL DIVISION

Rockwell Manufacturing
Company

640L North Lexington Avenue • Pittsburgh 8, Pa.

BE SURE TO SEE
all of these tools demonstrated
under power at the
1952 METAL SHOW
Philadelphia • October 18-24 .

October 9, 1952

177

SHELL INDUSTRIAL



**bring greater
under extreme**

FOR GEARS... **SHELL MACOMA OILS**

FOR ENCLOSED GEARS, Shell Macoma Oils solve the problem of extreme pressure lubrication with *seven distinct advantages*:

- 1. Extreme load carrying capacity . . .** remarkable ability to prevent wear and seizure . . . even after long periods under heavy load.
- 2. Long-lasting oxidation stability . . .** plus freedom from sludge formation in the presence of water.
- 3. Outstanding adhesion . . .** maximum

protection against rust, and against leakage through worn bearings and seals.

- 4. Non-corrosive . . .** will not cause corrosion of steel or alloy bearings.
- 5. Non-Foaming . . .** Shell Macoma Oils successfully overcome the tendency to foam caused by aeration of oil in the gear chamber.
- 6. Speedy water separation.**
- 7. Complete stability in storage and in service . . .** no tendency to separate, even in extremes of heat and cold.



Be sure to get all the facts about these Shell Macoma Oils. Check the coupon and attach to your letterhead for full information.



Two great products of

EP LUBRICANTS

**safety to gears and bearings
loads and adverse conditions**

FOR BEARINGS... **SHELL ALVANIA EP GREASE**

FOR GREASE-LUBRICATED bearings, Shell Alvania Grease . . . the one grease that serves *all* grease applications in the majority of plants . . . *now is available with EP qualities added! . . . now even more Multi-Purpose.*

All of these unique advantages of Alvania Grease are therefore available for the first time to operators of machines subject to extreme bearing pressures:

1. **Higher mechanical stability** than any conventional grease at operating temperatures.
2. **Pumpable at low temperatures** . . . even through centralized lubrication systems.

3. **Stable at high temperatures** . . . no phase changes—still a grease at high temperatures—still a grease upon cooling.

4. **Resistant to water** . . . won't wash out.

5. **Longer service life** . . . reduced consumption.

Shell Alvania EP Grease is the answer to some of the toughest lubricating problems in industry. In rolling operations, for example, operators of steel, rubber, plastic and paper mills report that this grease film *just won't be ruptured*, regardless of shock rolling load!



Check the coupon and mail today for additional information about Shell Alvania EP Grease.

Shell Oil Company
50 West 50th Street, New York 20, N. Y.;
or 100 Bush Street, San Francisco 6, Cal.

Please send available data on

☐ Shell Macoma Oils ☐ Shell Alvania EP Grease

Name _____

Company _____

Title _____

Address _____

SHELL OIL COMPANY

number 1
of a series

DIE CASTING is the Process...

2 **ZINC**, the Metal...

3 **BUNKER HILL**,
the Preferred Zinc



DIE CASTING is the fastest of the metal casting processes. As a high production method, die casting ranks with stamping, powder metallurgy and screw machine production where large quantities of identical non-ferrous metal parts are required.

Aptly named "the shortest distance between raw material and finished product" die casting has proved itself as a high-speed, accurate, low-cost production tool. The extent to which industry adopted this high-efficiency process is evidenced by the rapid and phenomenal growth of die casting and its concurrent — and still growing — importance as a consumer of non-ferrous metals. In 1926, for example, only 13,000 tons of zinc were used for the manufacture of die castings. In recent years, the industry's annual consumption of Special High Grade Zinc has averaged nearly 300,000 tons — making the die casting industry the largest single user of "four-nines" zinc in the United States.

Eastern Sales Agents: **ST. JOSEPH LEAD CO.**, 250 PARK AVE., NEW YORK 17

BUNKER HILL 99.99+% ZINC

Sales Office for Pacific Coast: **NORTHWEST LEAD CO.**, SEATTLE, WASH.



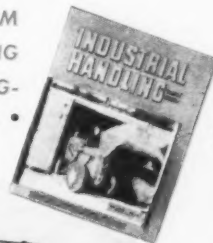
PROFITABLE MANPOWER

This man may have been good with a wheelbarrow and hand shovel, but his production is several times greater as a "PAYLOADER" pilot. He's happier and so is his boss because they both make more money.

When it's a matter of handling bulk materials — sand, scrap, coke, chips, limestone or *any* bulk material — chances are you can move it faster, cheaper and better with a "PAYLOADER" because these special tractor-shovels are proven cost-cutters in hundreds of foundries.

"PAYLOADERS" are available in seven sizes, from 12 cu. ft. to 1½ cu. yd., to master your jobs both indoors and outdoors. Get full facts *now* on cost-cutting, time-saving, production-boosting "PAYLOAD-ER." The Frank G. Hough Co., 733 Sunnyside Ave., Libertyville, Ill.

UNLOAD BOX CARS • CARRY SAND, COKE, SCRAP, LIMESTONE, ETC. • TRANSPORT AND DISTRIBUTE SAND TO MOLDING STATIONS • REMOVE USED SAND FROM FLOORS • WINDROW SAND FOR THE CUTTER • CHARGE MULLERS, TUMBLING BARRELS • FEED CONVEYORS, ELEVATORS, HOPPERS, MIXERS • CLEAN UP GANGWAYS, AISLES AND OTHER AREAS • HANDLE SCRAP, SMALL CASTINGS, SLAG • LIFT-HAUL-PUSH-PULL • REMOVE SNOW.



IDEAL PAY

and "Industrial Handling" is full of profitable ideas developed by "PAYLOADER" users. A request on your letterhead gets you on the regular mailing list without cost.

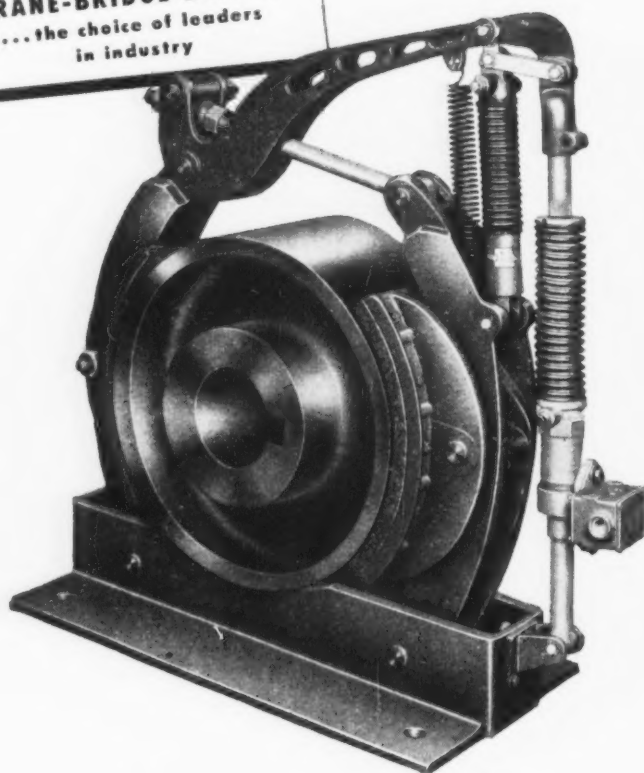


PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920



Wagner
CRANE-BRIDGE BRAKES
...the choice of loaders
in industry



Your cranes are safer when equipped with **Wagner** CRANE-BRIDGE BRAKE SYSTEMS

Your operators have full control of cranes when Wagner Hydraulic Crane-Bridge Braking Systems are installed. They stop your crane the way you stop your car—simply—positively—safely. Wagner Hydraulic Brakes provide even the heaviest steel mill ladle cranes with controlled deceleration for smooth, precise stops.

NEW
Snap-Acting Switch
assures complete
dependability

Wagner Type HM-2 Crane-Bridge Brakes are equipped with a positive limit switch that is mechanically operated by the piston rod of the releasing cylinder. Switch is snap-acting—no slow make-or-break contacts.

Safe while operating... Safe while parked

The new Wagner Type HM-2 Bridge Brake System provides operator-controlled hydraulic braking for service stops and spring-set braking for parking. The new limit switch positively holds the parking brake in released position, until it is set by the operator. The parking brake also sets automatically, to bring the crane to a gradual stop, in case of power failure. Limit switches can be used to automatically set the brake as the crane approaches the end of the runway.

The operator always knows when the parking brake is released because a signal light is illuminated only when the setting spring is fully compressed.

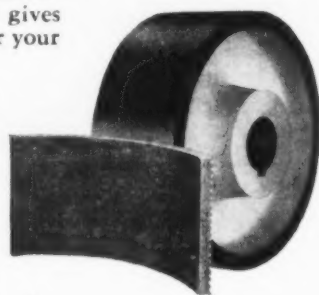
Only Wagner Hydraulic Braking Systems are equipped with the remote control bleeder that keeps the lines full of fluid and makes bleeding the system a simple "one-man one-minute" job, and only Wagner offers the self-centering device that prevents brake shoe drag by automatically assuring equal clearance of both shoes. Other features include one-point shoe adjustment, 200% emer-

gency torque, and non-scoring molded lining blocks that are easily replaceable.

If your cranes are not equipped with Wagner Brakes, we can show how simple it is to install a modern hydraulic system. If you still have old-style Wagner Brakes, your system can be easily modernized with our complete conversion kits. Bulletin IU-40 gives full information—write for your copy.

Replacement Lining and Brake Wheels

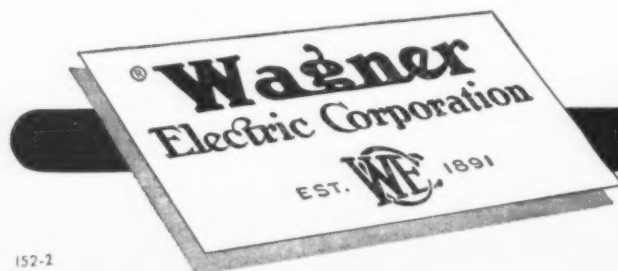
Wagner offers the perfect combination of brake wheel and non-scoring lining for replacement needs. Wagner Brake Lining is specially designed and manufactured to meet the exacting service requirements of industrial braking. It is available in rolls, blocks, and discs.



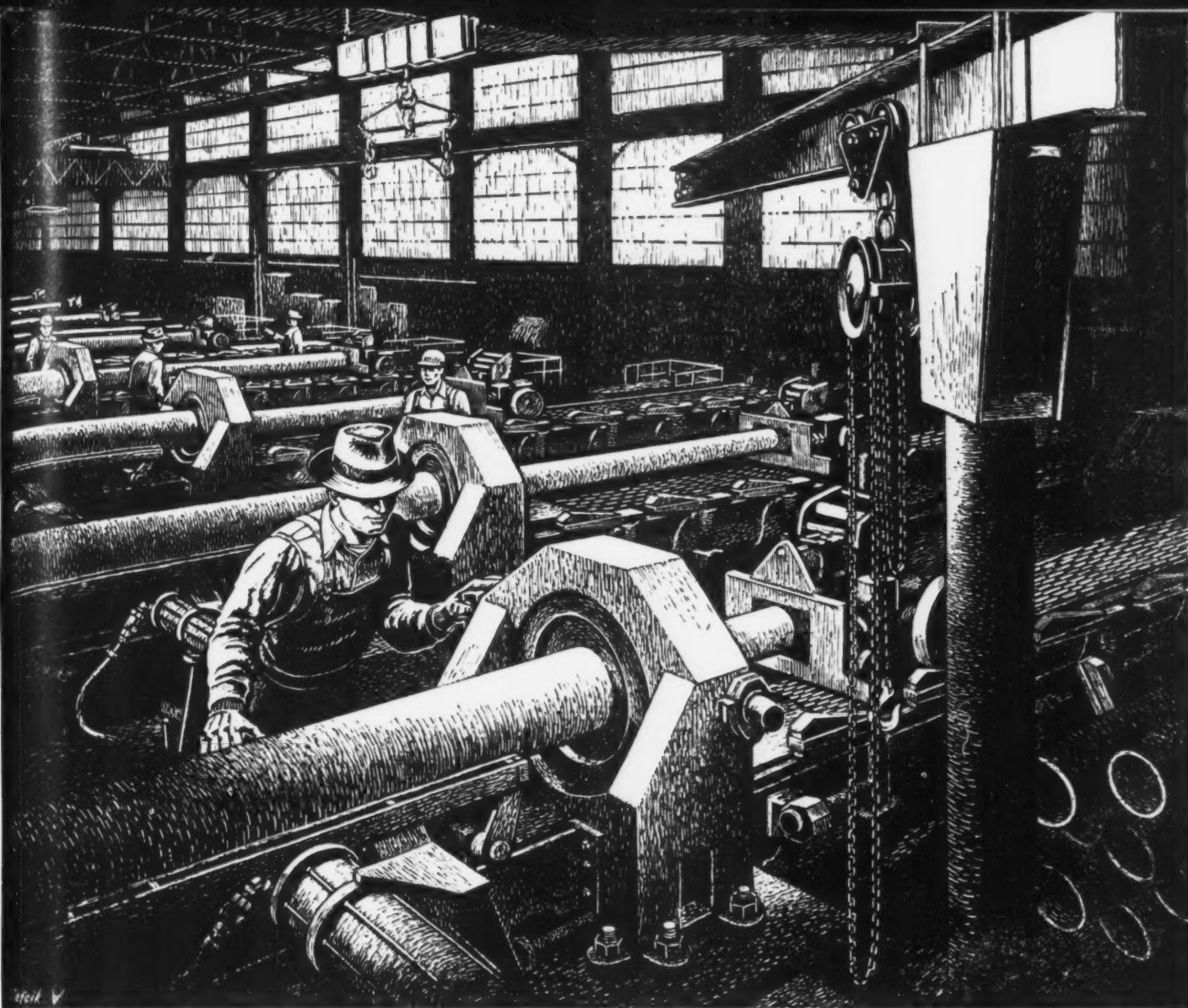
WAGNER ELECTRIC CORPORATION
6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES



152-2



Cold Drawn Mechanical Tubing

Scratchboard Drawing for Pittsburgh Steel Company by A. B. Sefcik

Progress in Steel... Means More Special Tubing

Cold drawn seamless tubing has long been a specialty at Pittsburgh Steel Company. Upon completion of its Program of Progress, which is increasing finished product capacity by 82% and ingot capacity by 50%, this high-quality product will become available in even greater quantities for many vital defense and civilian needs.

For example, the importance of Pittsburgh Mechanical Tubing to defense is demonstrated by the fact that it serves in such diversified ways as bushings for tank tracks, cylinders for aircraft hydraulic equipment—even as rocket launching tubes. Civilian uses include automobile drive shafts, pump plungers, and parts for farm equipment and machine tools, to name but a few.

Many manufacturers find that Pittsburgh Seamless Cold Drawn Mechanical

Tubing has the uniform physical qualities, size accuracy, and fine surface finish that makes it easy to machine—saves production time, cuts costs, and improves product performance. Also important to defense and civilian needs are other Pittsburgh Steel tube specialties for power plants, boilers, condensers, and refinery stills.

The expanded output of these important

products will be made possible by the extensive \$60-million Program of Progress which is designed to round out the company's line of products better to serve its customers. They in turn will be able to accelerate their production of vital items necessary to speed our national defense program—at the same time maintain a high level of civilian economy.

Program of Progress

Acquisition of Thomas Steel Company.....	100% Complete
Installation of new 66-inch High Lift Blooming-Slabbing Mill.....	100% Complete
Increase of Blast Furnace Capacity by 12% Per Year.....	60% Complete
Increase of Open-Hearth Capacity by 50% Per Year.....	50% Complete
Installation of Continuous 66-inch Hot Rolled Sheet-Strip Mill.....	70% Complete
Installation of 66-inch Cold Rolled Sheet-Strip Mill.....	50% Complete



Pittsburgh Steel Company

Pittsburgh, Pennsylvania

*A wide range of
end shapes are
offered by our*

SPUN END PROCESS*

Tubular parts having special end forms can, in a majority of cases, be produced most efficiently by the Wolverine Spun End Process. This process — an exclusive development of Wolverine's — offers unlimited opportunities for stepping-up product performance, for affecting economies in manufacture, and besides, achieve improved design.

You'll be interested in perusing our new brochure, Spun End Process, which will give you a more comprehensive idea of the many advantages and great versatility this process presents. A copy will be sent to you upon request.

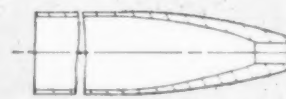
**Pat. Proc. Re. 22405*



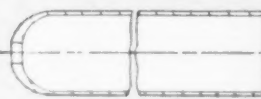
Spherical closure, wall considerably thickened on end.



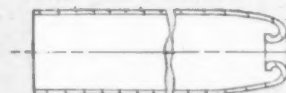
Square end, open.



Conoidal, with opening and controlled I.D.



Reduced opening, no neck.



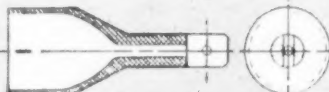
Reduced opening, wall thickened and turned back inside tube.



Reduced opening, short neck.



Reduced opening, long neck.



Round end with clevis.



Spherical closure, wall slightly heavier on end.



Round end, long reduced section.



Square end closure, wall thickened on end, and an additional press operation to obtain final shape.



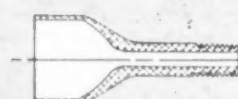
Flattened end, solid.



Conical closure.



Round end, threaded I.D.



Round end, threaded O.D.



Square end, solid.



WOLVERINE TUBE DIVISION

Calumet and Hecla Consolidated Copper Company

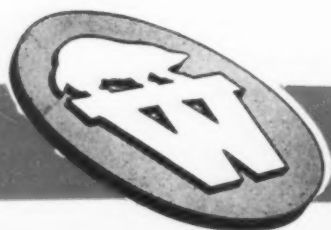
INCORPORATED

Manufacturers of tubing exclusively

1441 Central Ave.

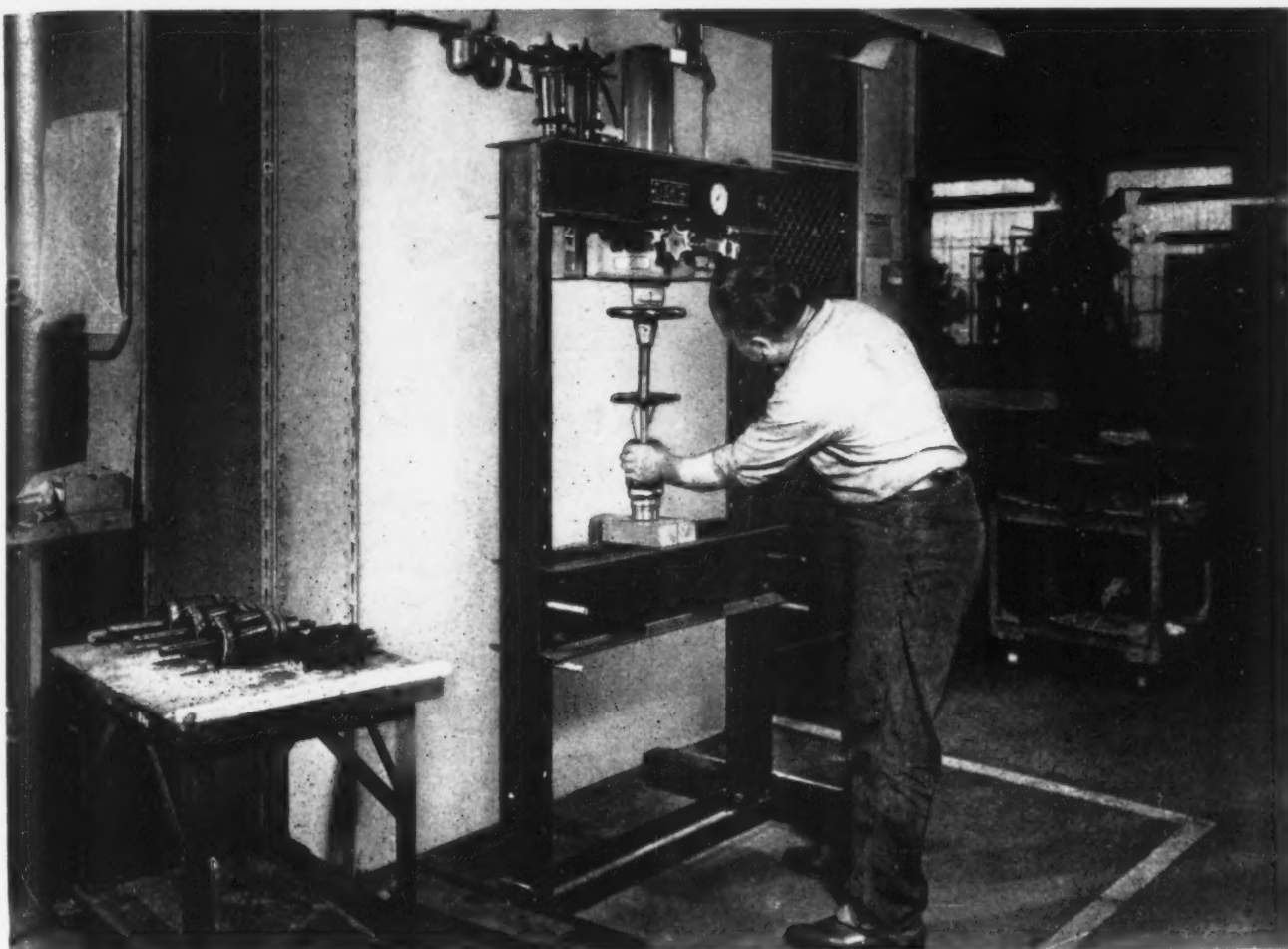
Detroit 9, Mich

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario



PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York 16, N. Y.



Motor Manufacturer Saves 15% on Labor Costs with Air-Powered **DAKE** Hydraulic Press

Here is another example of the way Dake Presses bring substantial production economies.

An electric motor manufacturer has a variety of forcing, forming, bending, and straightening jobs in his plant. These are a few of them:

Pressing fans on armature shafts (see photo above)

Pressing slip rings on armature shafts

Pressing commutators on armature cores

Pressing laminations to thickness for stator frames

Pressing arches in stator frame coils

Until recently these jobs were handled in a variety of ways—mostly on a hand press. Since installing the Dake Air-Hydraulic Press he finds there is a saving of about 15% on labor costs. He also reports that the press affords a quicker, easier way to do many jobs that formerly were handled on other equipment.

Dake Hydraulic Presses are available in hand, air, and electrically powered models with capacities from 25 to 300 tons. See your nearest Dake Industrial Distributor.



**Write for
this Catalog**

Dake Engine Company, 602 Seventh St., Grand Haven, Mich.

**DAKE
PRESSES**



Arbor
Presses



Hand-Operated
Hydraulic



Power-Operated
Hydraulic



Guided
Platen

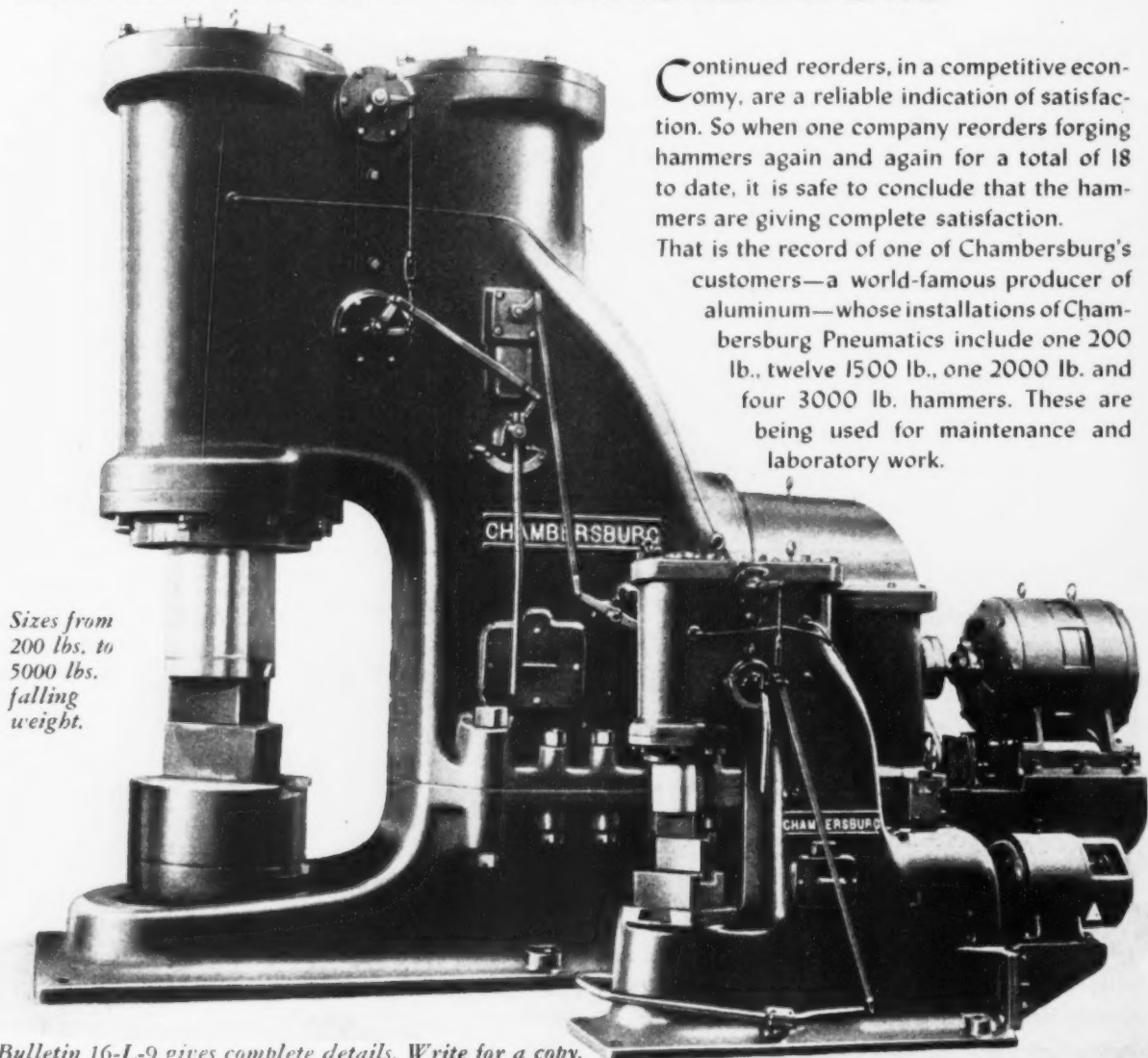


Gap Type
Presses



Movable
Frame

THE 18th CHAMBERSBURG PNEUMATIC FORGING HAMMER FOR ONE OF AMERICA'S LARGEST PRODUCERS OF ALUMINUM



*Sizes from
200 lbs. to
5000 lbs.
falling
weight.*

Continued reorders, in a competitive economy, are a reliable indication of satisfaction. So when one company reorders forging hammers again and again for a total of 18 to date, it is safe to conclude that the hammers are giving complete satisfaction.

That is the record of one of Chambersburg's customers—a world-famous producer of aluminum—whose installations of Chambersburg Pneumatics include one 200 lb., twelve 1500 lb., one 2000 lb. and four 3000 lb. hammers. These are being used for maintenance and laboratory work.

Bulletin 16-L-9 gives complete details. Write for a copy.

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PENNA.

CHAMBERSBURG

THE HAMMER BUILDERS

RG
R
ST

n-
c-
g
8
n-
s
of
n-
0
d
e
d



NA.



s Age

ON MINNEAPOLIS-MOLINE'S UNI-HARVESTOR...

SHAFT SIZE REDUCED from 1½" to 1¼"

BY USING **HIGH-STRENGTH**
GROUND AND POLISHED

STRESSPROOF®

INSTEAD OF
C1045

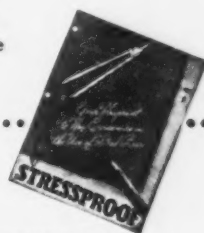
The UNI-HARVESTOR is really different. It harvests grains, beans, and all seeds—it picks and husks corn, and bales or chops hay. Ground and Polished STRESSPROOF is specified for the cylinder shaft.

● In designing this Cylinder Shaft, Minneapolis-Moline engineers specified Ground and Polished STRESSPROOF to meet the increasingly severe operating conditions to which this equipment is subjected. The alternative would have been lower strength shafting with an increase in size. The larger shaft would have been 44% heavier, and bearings and gears would have had to be redesigned. Ground and Polished STRESSPROOF proved to be stronger, had better fatigue properties, and machined better. It eliminated heat-treating and straightening operations, and the size accuracy provided a correct bearing mounting.

STRESSPROOF makes a better part at lower cost.

STRESSPROOF is a severely cold-worked, furnace-treated, carbon steel bar with a unique combination of four qualities in the bar: (1) Strength, (2) Wearability, (3) Machinability, and (4) Minimum Warpage. Yet it costs less than other quality cold-finished steel bars. Available in cold-drawn or ground and polished finish.

SEND FOR . . .
Free Engineering Bulletin
"New Economies in the Use
of Steel Bars"



La Salle Steel Co.
1412 150th Street
Hammond, Indiana

Please send me your STRESSPROOF Bulletin.

Name _____
Title _____
Company _____
Address _____
City _____ Zone _____ State _____



La Salle STEEL CO.

... the Most Complete Line of
Carbon and Alloy Cold-Finished
and Ground and Polished Bars in America.



"Our railroad bridge is an

EYE OPENER

for anybody with an assembly problem"

"Whether you're assembling toasters or bridges," Ken went on, "it pays to set your sights on fasteners."

"Fasteners?" asked Jack.

"Right!" affirmed Ken. "We've saved plenty by taking the RB&W man's advice to switch from rivets to high strength RB&W bolts in assembling high stressed structural joints."

"These bolts stay tight and that saves us maintenance. They assemble faster, and that saves us labor and construction time."

There's a cost-cutting lesson for you in this story, whatever your industry.* So look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New inventions, like RB&W's SPIN-LOCK Screw, may prove more efficient

than the fasteners you're now using.** Or you may save by the stepped-up production you get from using the finest fasteners...RB&W bolts, nuts, rivets and screws of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W at Port Chester.

RB&W—The Complete Quality Line. Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, San Francisco. Sales agents: Portland, Seattle. Distributors from coast to coast.

**RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY**

RB & W

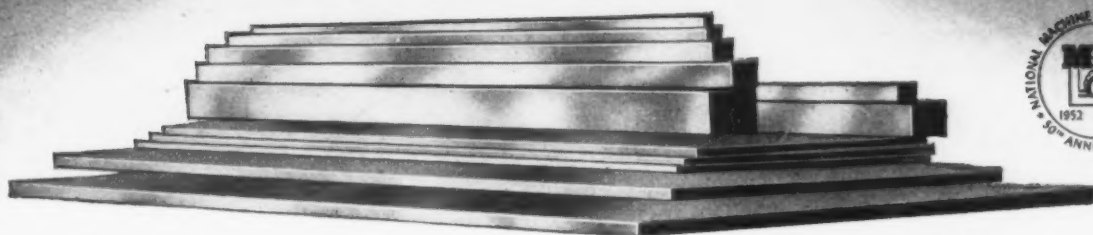
107 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

*If you're interested in construction, write RB&W at Port Chester for the free article, "No More Riveting."

**New SPIN-LOCK Catalog is in the Product Design File. Write for extra copies.

GET UP TO 50% MORE PIECES
from punches and dies made with...

Starrett No. 497 AIR HARDENING PRECISION GROUND DIE STOCK



UP TO 50% MORE PIECES PER SHARPENING! That is what you'll get with punches and dies made from the new Starrett No. 497 *Air Hardening* Precision Ground Die Stock. 5% chromium content plus a special analysis to insure good hardening properties makes it highly wear resistant — ideal for long run production dies and punches and for stamping silicon, stainless steel, Monel and other abrasive materials. Also for thread roller dies, rolls, master hubs, precision tools, gages, large blanking dies, long punches, trimming dies, forming dies, coining dies, machine parts and other precision pieces.

New Starrett *Air Hardening* Die Stock is non-deforming... no distortion, no cracking, no costly rejects, less finish grinding. It's fully spheroidized annealed for easy machining with a wide hardening range for foolproof heat treating. Order a supply today through your distributor. He'll give you prompt, dependable, quality service.

"JUST LAY IT OUT . . . AND SAW IT OUT"
For best results use Starrett Band Saws

**NOW—
4 TYPES—295 SIZES**

NO. 497 AIR HARDENING
(Non-Deforming)

NO. 496 OIL HARDENING
(Non-Deforming)

NO. 495 OIL OR WATER HARDENING

NO. 495 WATER HARDENING

Flat stock in 18" lengths, die stock in 36" lengths. Thicknesses from 1/64" to 3" — widths from 1/8" to 14". Each piece marked for size and type and packaged in protective envelope.



NEW FOLDER and WALL CHART lists all sizes plus formulas for air, oil and water hardening. Write for it. Address Dept. **MA**

	<h2>Starrett</h2> <p>TRADE MARK</p> <p>SINCE 1880 WORLD'S GREATEST TOOLMAKERS</p>	<p>THE L. S. STARRETT COMPANY Athol, Massachusetts, U. S. A.</p> <p>MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK HACKSAWS, BAND SAWS and BAND KNIVES</p>	<p>Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR</p> <p>Prompt delivery Dependable service Quality products</p>
--	---	--	--

VISIT THE STARRETT EXHIBIT — BOOTH 1843 — National Metal Congress — Philadelphia, October 20-24

October 9, 1952

The U. S. Steel Supply team that gives you *personalized service*



...our salesman

puts this team to work for you!

SUPPLYING YOUR STEEL requirements becomes our team objective when you tell your needs to your U. S. Steel Supply salesman. Behind your salesman is a team of technical experts, each one a specialist in his field . . . and your business receives the attention of every member of the team who can contribute to its progress.

What do you need? Steel? Tools? Special purpose equipment or machinery? Advice on working an unfamiliar type of steel? Help in meeting a pressing delivery date? Give your order to your U. S. Steel Supply salesman. He will see that it gets immediate attention from the U. S. Steel Supply specialists best qualified to serve you.

YOUR "ONE CALL" SOURCE OF STEEL SERVICE

U.S. STEEL SUPPLY



UNITED STATES STEEL SUPPLY DIVISION, UNITED STATES STEEL COMPANY
HEADQUARTERS: 208 So. LA SALLE ST., CHICAGO 4, ILL. WAREHOUSES COAST-TO-COAST

Warehouses and Sales Offices: BALTIMORE • BOSTON • CHICAGO • CLEVELAND • LOS ANGELES • MILWAUKEE • MOLINE, ILL. • NEWARK • PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • TWIN CITY (ST. PAUL) • SAN FRANCISCO • SEATTLE
Sales Offices: INDIANAPOLIS • KANSAS CITY, MO. • PHILADELPHIA • PHOENIX • ROCKFORD, ILL. • SALT LAKE CITY • SOUTH BEND • TOLEDO • TULSA • YOUNGSTOWN

UNITED STATES STEEL

THE IRON AGE Newsfront

► Metal Show visitors will note some companies are well aware the customer is climbing back into the driver's seat. Advance indications are there will be more hard selling, more practical demonstrations than there have been at any Metal Show for the past dozen years.

► The first large sized coil of titanium strip made will be on exhibit at the Metal Show. The coil is 460 ft long, the strip 37 in. wide and made of RC 70 titanium. This is not a commercial product and was made for exhibition purposes only.

► Large cities may have stocks of new lower priced autos but the smaller towns and villages are sold out most of the time. The Southern market for used cars is active with agents continually showing up at Northern auctions of lower priced cars--especially 1949 and 1950 models. A good market for 1947 and 1948 models also prevails. Even though new cars are selling better than generally supposed, buyers continue price conscious.

► Submerged arcwelding is being used to repair crane wheels, kiln tires and various types of rolls and shafts. New flexible welding equipment, having an extension nozzle with a welding head, is being used for some repair jobs.

► At the Sept. 30th meeting of the U. S. Army Metallurgical Advisory Board on Titanium, one subject which received considerable attention was: "How can we expand the use of the metal?" Nobody came up with a good answer, primarily because metal costs are still too high to be competitive with other materials.

► Laboratory tests show that use of an oxidation inhibitor in transformer oil base stock gives an expected service life three to five times greater than conventional transformer oil.

► Machine tool industry will probably operate at a satisfactory overall rate until June 1953. After that it's anybody's guess unless Congress votes enough money to keep defense procurement levels up. Some think the best stimulant to keeping the industry healthy is reform of present laws on depreciation. There is some hope that various government agencies are coming around to this point of view.

► Farm purchasing power looms as a bigger and bigger factor in industry. Buying habits in family centers are no longer different from those in cities. Mortgage commitments are up. Sales of appliances, home furnishings, farm implements are good. Farmers are well heeled but look for quality and cost saving features in products offered.

► Fabricated structural steel inquiries are running well behind last year. One large fabricator reports a drop of 25 pct. Tip-off came recently when 28 companies submitted bids on a 200-ton job. Pickup is expected late this year.

► Interest in Great Lakes barge shipping is developing among barge shipping people. At least one concern is studying designs for a barge that could be handled on the Lakes, and if plans are acceptable, can be expected to approach the ICC on the matter in the near future. Barges would not vary greatly from conventional models but would be of heavier construction and have greater freeboard.

► Since 1947 it is estimated that production of 7 million ft of quenched and tempered oil well casing by a single large producer has saved 300,000 lb of molybdenum and nearly 1,500,000 lb of manganese. Formerly, such pipe was normalized and tempered--alloy additions furnished necessary hardenability.

MINNEAPOLIS
Sept. 29, through Oct. 1.

MILWAUKEE
Oct. 7, through Oct. 10.

*Coming
to help you*

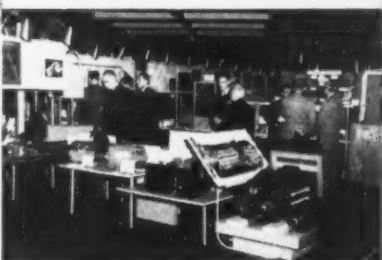
**solve problems in design
and production!**



"BRINGING the mountain to Mohamet might best describe Dow Corning Corp.'s traveling exhibit . . . Free standing panels . . . separate the exhibit into nine bays, each emphasizing a property of silicones and showing where that property brings a benefit to an actual end product or operating unit . . ."
INDUSTRIAL MARKETING (June 1952)



"NEXT TO THE GREATEST SHOW ON EARTH . . . We could go on . . . reciting the fantastic properties of Silicones, but just as breathtaking as the materials were the display techniques used to demonstrate them . . ."
CIRCUIT RIDER (Vol. 6, No. 2, published by Electrical Construction and Maintenance)



" . . . Heat Stability Plus: Visitors . . . see, among other demonstrations, how Silastic (Dow Corning's silicone rubber) remains soft and flexible at temperatures far above the limits of organic rubber . . ."
CHEMICAL WEEK (Jan. 26, 1952)

ST. LOUIS
Sept. 23, through Sept. 26.

*In Boston • Chicago • Cleveland • Dayton
Detroit • Fort Worth • Houston
Indianapolis • Los Angeles • New York
Philadelphia • Pittsburgh • Seattle
Washington, D.C. • or Wichita.

DON'T MISS IT
MAIL THIS COUPON TODAY

Dow Corning Corporation, Dept. O-22
Midland, Michigan

Kindly include me among your guests at the private showing of the Dow Corning Silicone Exposition in

☐ St. Louis ☐ Buffalo
☐ Minneapolis ☐ Newark
☐ Milwaukee ☐ New Haven
☐ Cincinnati ☐ Baltimore

☐ Winston-Salem

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

"IF YOU HAVEN'T already seen it, don't miss it when it comes around . . ."
POWER ENGINEERING (May 1952)



DOW CORNING

Atlanta
Chicago
Cleveland
Dallas
Los Angeles
New York
Washington D. C.

**DOW CORNING
SILICONES**

CORPORATION
MIDLAND, MICHIGAN

CANADA: Fibreglas Canada Ltd., 1200 Bay St., Toronto, Ontario
ENGLAND: Midland Silicones Ltd., 49 Park Lane, London, W.

BUFFALO
Oct. 29, through Oct. 31.

NEW HAVEN
Nov. 11, through Nov. 13.

BALTIMORE
Nov. 18, through Nov. 20.

NEWARK
Nov. 4, through Nov. 7.

CINCINNATI
Oct. 21, through Oct. 23.

WINSTON-SALEM
Dec. 9, through Dec. 11.



**DOW CORNING
SILICONES . . .** are no longer a mystery or a "future possibility" to the 17,000 executives and engineers, representing more than 4600 plants, who have already seen the Dow Corning Silicone Exposition.*

They learned that silicones are fluids and resins that keep clothes and shoes and brick walls dry in the rain. They're fluids that polish without rubbing.

They're rubber that won't melt on hot aircraft engine cylinders or freeze on switches that operate bomb bay doors at 100° below zero.

They're electrical insulating resins and varnishes that double the power of electric motors, or multiply by 10 the life of electric machines.

They're paints that protect metal at 1000°F. They're foam killers and release agents. They're a whole family of new engineering materials that can help you to improve your product or to cut production costs.

STEEL: What Will the Industry's Future Be?

Experts expect evolution, not revolution . . . Future expansion will be well planned . . . Changes faster . . . Steel will be made faster, tougher, with less waste—By W. V. Packard.

What will the steel industry of tomorrow be like? Companies building or expanding great plants at costs of \$300 or more per ton of capacity would like to know—for sure.

To protect their huge investment and make expansion as prudent as possible they are making exhaustive studies of future possibilities. In their studies they try to analyze future trends in markets, equipment, processes and expansion—even in other industries.

They admit that their growing commercial research is not an exact science—that, at best, their forecasts are educated guesses. Yet this is quite a forward step from even a few years ago when practically no professional talent was utilized in planning the future.

Steel of the Future — Putting some of their forecasts together, here is what steel of tomorrow might be like:

Steel of the future will cost more. But it will be tougher; it will do more work; and it will last longer. Production processes will be basically similar to present practice. But technological improvements will per-

Year	Capacity (million net tons)	Production (million net tons)	lb per person
1900	21.2	11.4	330
1910	39.4	29.2	633
1920	52.3	47.0	886
1930	73.0	45.6	741
1940	81.6	67.0	1015
1950	100.0	96.8	1263
1951	103.2	105.1	1362
1952	108.6	....	....
1953	115.6	....	....
1954	123.0	....	....
1975	150.0	....	....

mit the metal to be melted and refined faster, under much closer metallurgical control. And there will be less waste. The engineer will help the metallurgist improve strength with new shapes and better design.

Evolution, Not Revolution—But don't expect this to happen overnight. Great size, weight and in-

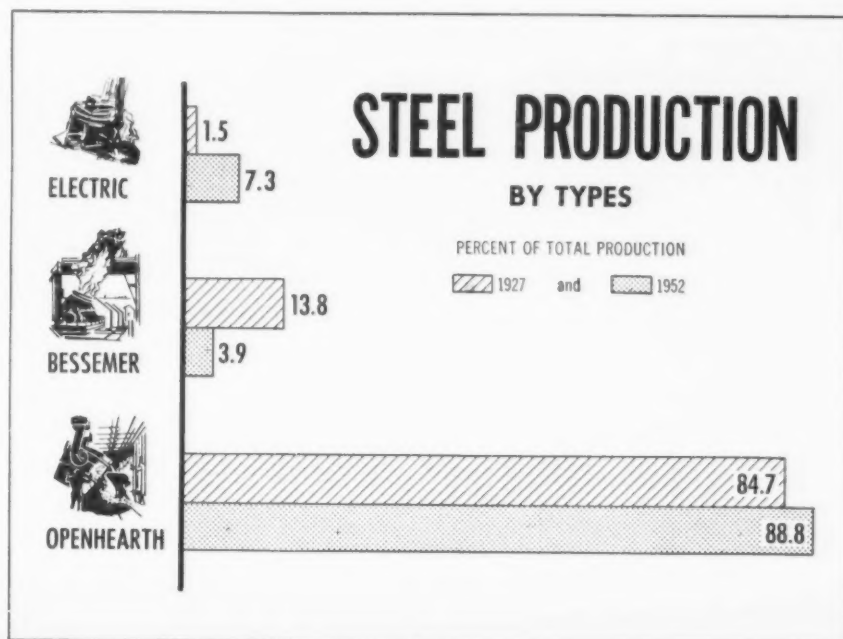
vestment in modern steel plants almost preclude sudden change. Revolutionary developments such as the continuous rolling mill come rarely in such heavy industry. When they do come, the change requires years, not months, to be completed.

Yet the years ahead will probably bring more and quicker changes than the ones behind brought. This is because the steel industry is no longer growing like Topsy; its expansion is being carefully planned. Location, area, plant layout, equipment, and materials handling decisions are all made with an eye to the future.

New plants and new firms will provide a receptive environment for steelmaking progress. The pilot plant has already become a standard proving ground for new processes in this as well as other industries. Biggest boost will come from firms that are convinced research pays off.

Taconite, direct reduction, turbo-hearth, continuous casting, hot and cold extrusion are words to watch. In the next 25 years one or more of these will probably shape the course of the steel industry more than the continuous rolling mill did during the last quarter century.

In projecting steel demand to 1975, the President's Materials Policy Commission arrived at a figure of 150 million net tons, of ingots and



Special Report

steel for castings. Prior to the Korean conflict and the current huge expansion program, this would have sounded fantastic. Now hardly an eyebrow is being raised. Look at the expansion record since 1900, projected to 1975 (see table p. 193).

Iron Ore—Raw materials supplies will have to be expanded to keep pace with steel. Iron ore will come from three main sources: (1) High grade domestic reserves; (2) beneficiation of low grade reserves; and (3) imports.

Total domestic reserves of iron ore are estimated at some 80 billion gross tons. (Record consumption last year was a little more than one-tenth of one billion.) But only a fraction of this total is high grade.

Ore costs are bound to go up as mining goes deeper and expensive beneficiation plants are built. Such plants are now under construction and limited tonnage of beneficiated ore pellets is being produced.

These plants will be completed at capital cost of perhaps \$25 to \$30 per ton. Within 5 years they will be producing 15-20 million tons of beneficiated ore. After that output could be expanded as demand warrants capital investment.

Low-grade ore deposits may one day be beneficiated and smelted locally in small electric furnaces or low shaft blast furnaces. Both processes produce high grade pig iron with a minimum of coke.

Imports of high grade ore (mostly from Canada and Venezuela) will expand at an equal if not faster rate than beneficiation. Rising costs of producing domestic ore will make them even more attractive. If beneficiation keeps domestic output from falling, imports will probably be able to fill the big gap of expanding consumption.

New Alloys—Coal reserves are adequate. But use of poorer quality material will require more

and better facilities for preparation and blending. Limestone is plentiful. Fluorspar reserves are limited, will probably be augmented by deriving fluorine from phosphate rock. Such a process is now under development.

Most of our alloying metals must be imported. Future availability of them, to some extent beyond our control, will be an important factor in metallurgical practice. Conservation will be the keynote; better steels will be made with less strategic material. Use of rare earths will increase. And alloying combinations as yet untried will spring to the fore.

Several processes for direct reduction of iron have been employed to produce sponge, pellets or briquettes. Though these methods have been gaining stature in Europe, they are considered costly compared with domestic practice (further refining is necessary). Yet some variation may eventually be used to develop local deposits of U. S. ore.

Hard to Beat—The modern blast furnace still operates on the same principles as its early ancestors, though its size dwarfs them by comparison. Its efficiency has been greatly increased by washing, treating and blending coal and ores. Adoption of high pressure tops can increase efficiency by perhaps 15 pct, while using 10 pct less coke. Employment of natural gas may be used to further reduce coke consumption. Though other ore smelting methods may be adopted, this work horse of the industry will be with us for a long time, because it is highly efficient and is still being improved.

Nearly 90 pct of our steel is produced in openhearth furnaces. Electric furnace output is increasing and now accounts for about 7 pct. Bessemer converters, though popular in Europe, are declining in this country.

Short Cut—Continuous casting has a bright place in steel's fu-

Iron & Steel—1950 and 1975

Production, Consumption of Materials, Capacity
(million net tons)

	1950	1975
Production		
Crude products:		
Steel mills—ingots and steel for castings	96.8	150
Foundries—rough castings	23.0	35
Total crude products	119.8	185
Finished products:		
Steel mills—including steel castings	72.2	112
Foundries—finished iron castings	15.3	23
Total finished products	87.5	135
Consumption of Materials		
Home scrap	35.9	60
Purchased industrial scrap	10.9	15
Purchased obsolete scrap	22.0	32
Total scrap	68.8	107
Pig iron	65.0	100
Iron ore (assuming 50 percent recoverable iron)	130.0	200
Blast furnace and foundry coke	64.4	90
Limestone	33.5	50
Capacity		
Steel ingots	100.0	160
Blast furnaces	71.5	100
Byproduct coke ovens	72.5	100

Source—Report of President's Materials Policy Commission.

Raw Materials

ture. Savings in scrap, equipment, and thus the cost of finished steel are possible. The process is particularly applicable to small operations. But it will not make ingot molds, stripping cranes, soaking pits and blooming and slabbing mills obsolete in large plants.

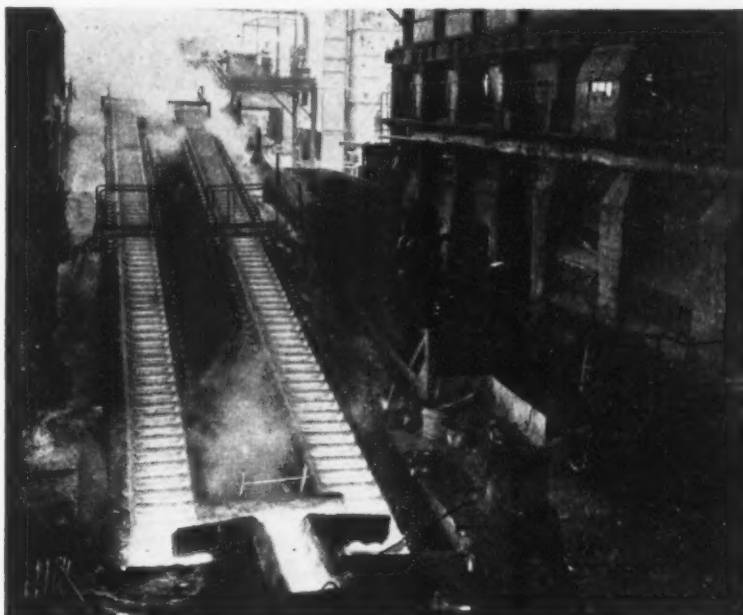
Extrusion Savings—Steel fabrication will be done quicker, cheaper and with less material by means of hot and cold extrusion. Both these processes, which use pressure to force the steel to flow into the desired shape, are being advanced rapidly. Only last week, Mullens Mfg. Co. reported its Koldflo process, heretofore limited to shell production, was being expanded on a commercial basis. It is also open to licensing.

Atomic Power—Development of atomic power will have a profound effect on the steel industry. Some processes now considered uneconomic or unfeasible may then loom quite attractive. The electric furnace—which has been gaining respect on its own right because it does so many things so well—may spurt into even more prominence.

Dream Plants — Small steel plants may one day grow—perhaps stimulated by protection of local freight umbrellas—in areas where no steel is now made. Such new plants would be among the first to use new developments (they usually have in the past).

They would use local or sea-borne materials. And they might employ some combination of atomic power, electric smelting, direct reduction, turbo-hearth, oxygen, continuous casting, and hot and cold extrusion. Their location and product mix would be influenced by location and trends of their customers, just as the huge new Fairless works and expanding Sparrows Pt. plant are today.

Coastal locations will continue attractive as handy points of export, as well as accessibility to raw material imports.



PIG CASTING: Seventy ft will be added to this pig casting machine as part of Pittsburgh Coke & Chemical Co.'s \$20 million expansion plan. Length will be 220 ft. It will have a capacity of 1600 tons per day.

Coke Oven Battery Starts

Pittsburgh Coke & Chemical Co. last week began getting the benefit from one unit of its \$20 million expansion program at Neville Island, near Pittsburgh. Thirty-five new chemical-recovery coke ovens were put into full production, raising the number of ovens to 140 and increasing coke output by approximately one-third. Annual production previously was 600,000 tons of furnace coke, 75,000 tons of foundry coke. Cost of the new ovens was \$6 million.

When completed, the expansion program will increase iron, coke, chemicals, and cement output of the plant. Company hopes to realize production from its new \$8 million blast furnace before December. This will add 300,000 net tons of iron to present output from one other furnace now producing 470,000.

Approximately \$3.3 million is being spent on four new chemical plants. This is in addition to more than \$7 million spent on chemical expansion in the last 4 years. Cement production, now at an annual rate of 1.5 million bbl, will be increased 20 pct.

Boiler plant capacity also is being expanded.

Since end of World War II, the company has committed \$34 million to expansion.

Pittsburgh Coke & Chemical is the only major producer of merchant pig iron in the Pittsburgh area.



MORE IRON: New \$8 million blast furnace (background) at Pittsburgh Coke's Neville Island plant will raise iron output by 300,000 tons per year.

STRUCTURALS: Won't Ease Yet

Demand running high . . . Allocations carry 2 months into next quarter . . . Quote 9-month delivery on fabricated steel . . . First quarter quotas limit new starts—By R. L. Hatschek.

The tight steel supply is generally expected to start loosening in the first quarter of 1953. This will not be true of structurals and heavy plate used in construction, according to suppliers and fabricators contacted by THE IRON AGE.

Only the most optimistic feel that these could begin easing in the second quarter and some believe the tightness will continue until near the end of 1953. This picture might change if the railroad carbuilding program were to bog down further, but there haven't been any signs pointing to that.

Demand for structural steel remains heavy with consumers pressing for delivery. The 2-month production loss in this market really hurt. Some people were apparently misled by heavy mill shipments immediately after the strike's end, losing sight of the 2 months' lost output.

Despite the decline in quarterly

allocations, actual deliveries of structurals may increase in some cases. This is explained by the fact that the strike caused delays in shipments of earlier allocated material. The delayed rated orders carry over into the following quarter.

Get in Line—This has resulted in a 2-month carryover from one quarter to the next. Rated orders were doubled up in October and November and fourth quarter CMP tickets will be good for January and February. If you have the right priority and can get first quarter allocations of structural steel it still won't be rolled until March.

Mill will then deliver to the fabricator in April and fabrication will take another 2 months. That adds up to 9-month delivery if you get busy now. Some of the smaller fabricators are reported to be quoting shorter delivery time in

order to get the few inquiries now coming out in some districts. The trade generally figures the only way this could be accomplished would be by reshuffling orders and steel on hand.

Fabricators in those areas where new inquiries are light are not unhappy about it. It gives them a little more time to catch up on outstanding orders. But the turn of the year is expected to bring a whole rash of new highway jobs in the East. Ohio Turnpike, extensions of the New Jersey and Pennsylvania Turnpikes, the Garden State Parkway (New Jersey) and the Schuylkill Expressway (eastern Pennsylvania) are some of the super highways that are just out

Construction Awards, Inquiries on P. 207

or will be coming out at the beginning of the new year. And they'll take a lot of structurals and plate.

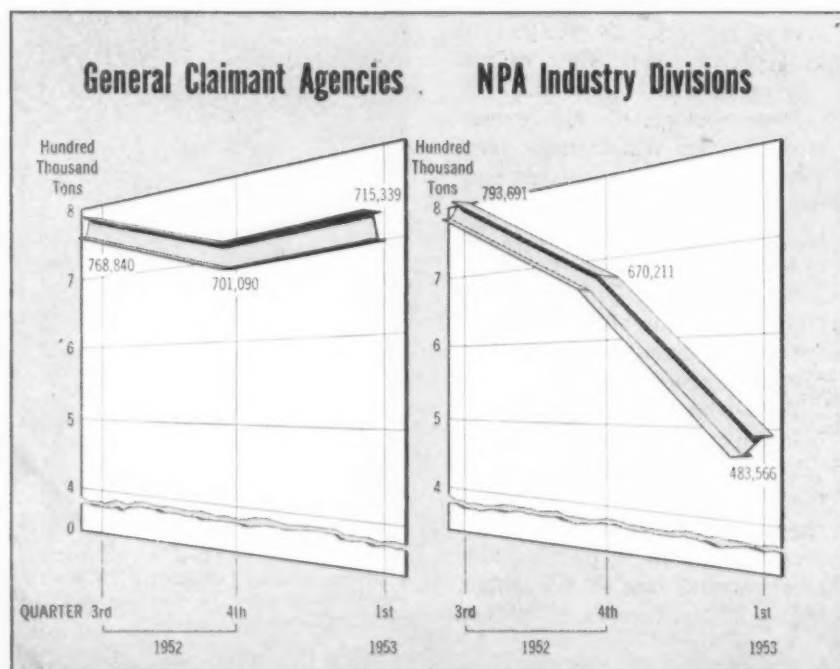
As a result of tightness, many buildings are now being designed for reinforced concrete construction. This is particularly true of new school projects.

Starts Limited — Following its usual allotment pattern, Defense Production Authority has assured Atomic Energy Commission and the military of meeting all requirements in the first quarter. With a few exceptions, all other structural steel allotments are limited to advance first quarter allocations. Quotas total 1,317,096 tons against an estimated supply of 1,415,000 tons.

This means that limited construction can continue on projects already started. But new starts will be limited to industrial expansion, commercial and municipal projects directly essential to the defense program.

Defense Dept. will get the biggest ration (185,000 tons compared to 173,000 tons in the fourth quarter). AEC, Civil Aeronautics Administration, Defense Materials Procurement Agency, and Bureau of Public Roads were the only other general claimant agencies to get boosted quotas. None of the National Production Authority industry divisions were increased.

Allocations of Structural Steel



INDUSTRY: How to Move Back to Farm

**What management can expect when moving to rural site . . .
What it must consider . . . Towns want industry . . . Firms
should hire local workers, gain good will—By J. B. Delaney.**

What happens when industry moves into a rural or semi-rural community? Management of many companies contemplating decentralization are asking that question. The answers are encouraging.

Initial reception will be good. So say companies who have been through the experience. Whether community attitudes stay that way depends on avoidance of pitfalls that might lead to trouble.

Most communities are anxious to attract industry. In fact local boosters are sometimes oversold on the advantages of their community.

Take the town that offered a 200-acre site with a good-sized, deep gravel pit smack in the middle of it to a large electrical equipment manufacturer. The company just couldn't figure how to build a plant in the shape of a railroad round-house.

Check for Overcharge—A well-known company also has had this experience: The community thought the firm had been overcharged by the owner of the site. Townsfolk raised a fund equal to what they considered the overcharge and presented a check to the plant manager. The company returned the check, but "gratefully retained the good will which the check symbolized."

Once the plant is built and ready to operate, the industrial newcomer has these problems to consider:

(1) Supervisory Jobs—One company with a successful history of getting along with its neighbors has established a firm policy of importing only enough supervisors to get the plant underway. After that, these jobs are given to local people who qualify. This often requires a period of company-spon-

sored training of promising candidates.

Using local people for the better jobs is good preventive medicine against gossip that outsiders are running the plant.

(2) Selecting Plant Manager—This man must be as good at public relations as he is at managing. He and his supervisors must be-

Checklist on Site Advantages

Selection of a plant site involves many considerations and a great deal of care. Points to watch before moving or building include:

- (1) Labor supply
- (2) Labor rates
- (3) Transportation facilities
- (4) Housing
- (5) Schools
- (6) Churches
- (7) Shopping facilities
- (8) Community and county debt and tax structure
- (9) Water, gas, and sewage facilities
- (10) Availability of vocational schools for training programs
- (11) Community plans for attracting industry
- (12) Does the community want you as a neighbor

come part of community life and should be looked up to as community leaders.

They must give forthright answers concerning the company, its employees, and its operations. They must work with school, church, and community leaders on mutual problems.

One company joined with business and civic leaders of a Pennsylvania town to solve a problem of inadequate hotel facilities. A corporation was formed and a hotel was built. The company turned over most of its stock in the hotel

to a local hospital, retaining only enough to make sure its customers and visitors could get a hotel room.

(3) Training Workers—Often skilled workers are not readily available despite an overall adequate supply of labor. This problem is solved with training programs. Some craftsmen who have moved from a community to another offering more opportunities lose no time returning to the home town once jobs are available.

Companies have found that farm workers and women quickly become adjusted to work in industry. They make good workers, are steadier on the whole than workers in strictly industrial communities. They are readily trained. A safety supervisor of one company finds that people unaccustomed to industrial work often adjust to an operation better than some old-time industrial workers.

Locating in a small community generally offers no advantage from the standpoint of wage rates. The experience of a large manufacturer is that "you can't run away from high labor rates."

Basic Needs—Not every community will have all of the advantages listed in the accompanying box. But lack of one or more basic needs would be the signal to go slow. Often a preliminary investigation will be encouraging, but a further check will uncover something to rule out a site under consideration.

On a re-check of what apparently was a good site, one company's field team was bowled over by a large sign in a hotel lobby reading, "Water shortage! Waste not, want not!". Careful inquiry revealed a questionable water supply. The site was dropped.

Sometimes intangible considerations will be a deciding factor in selecting a plant site. Before settling on a location for a new plant, a manufacturer decided to take a poll of engineers who would be asked to move to a new community. The engineers were asked

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

ANNOUNCING . . .



OIL HARDENING TOOL STEEL

WL introduces "Whelco"—a new tool steel of M grade—a new steel of maximum toughness, hardness and strength—a steel to assure maximum results at low cost! "Whelco" offers great penetration of hardness, great toughness at high hardness, wide hardening range, fine grain structure, and desirable non-deforming characteristics. "Whelco" has good forging properties and is readily machinable in the annealed condition. All WL warehouses stock "Whelco" M tool steel in a wide variety of flats and squares. Call your nearest WL man for a trial order—the results will speak for themselves!

WL steels are metallurgically constant. This guarantees uniformity of chemistry, grain size, hardenability—thus eliminating costly changes in heat treating specifications.

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.



WHEELOCK, LOVEJOY & COMPANY, INC.

Warehouse Service

CAMBRIDGE • CLEVELAND
CHICAGO • HILLSIDE, N. J.
DETROIT • BUFFALO
CINCINNATI

In Canada
SANDERSON • NEWBOULD, LTD., MONTREAL

HY-TEN
and **AISI**

126 Sidney St., Cambridge 39, Mass.

and Cleveland • Chicago • Detroit
Hillside, N. J. • Buffalo • Cincinnati

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

Management

whether they would prefer to live in a rural area, a metropolitan area, or the suburbs of a metropolitan area. About 80 pct preferred living in a rural community adjacent to a metropolitan area. One site under consideration suited this preference admirably.

Manufacturers also find that in moving people from one location to another they must offer the employee a better job to offset the usual problem of adjusting to a new community, new friends, new schools for children.

Time's Ripe for Expansion

Industry leaders are finding that the time is still opportune for expansion and are transforming their new plant blueprints into actuality. Management sank more money into expansion during the third quarter this year than in any other quarter in history. This was in the face of restrictions and shortages.

Dollar volume for the quarter amounted to \$9.3 billion, bringing the total for the first 9 months of 1952 to more than \$24.2 billion. There are solid indications that industry will spend \$32 billion this year in new construction. This was the amount forecast before the steel strike. But steel strike or not, industry still pushes for that goal.

Executives in charge of construction are watching Defense Production Administration for clues as to the future availability of structural. DPA has announced that enough will be available in the first quarter 1953 to permit work to continue on started projects.



"I like the attitude of that new man."

THE IRON AGE

AUTOS: Producers Vie in Man Hunt

Wonder where next assembly line worker is coming from in a tight labor market . . . Signs point to long-term scarcity . . . Detroit, outside auto centers stricken—By R. D. Raddant.

Automobile producers are nervously sweating over the problem of where their next assembly line hand is coming from. If they are not actually facing a shortage in manpower, then, at least, automakers are engaged in an intensely competitive hunt for workers.

A plant in a small outstate Michigan city closed suddenly last week. The very next day personnel men from three large corporations were in town trying to recruit as many as possible of the 300 newly unemployed.

Meanwhile, one major auto manufacturer scrapped plans for a second shift and settled for a 9-hour day. Reason: Its employment office was unable to come up with enough workers.

A large help-wanted ad in a Detroit newspaper announced that 2000 jobs were open at another auto plant. Other ads held out overtime and other "bait" to workmen.

Long or Short?—These are not isolated incidents. They are repeated every day in the auto industry and related branches.

Optimists predict the labor market will balance when new model production levels off and the rush to catch up with steel strike production losses is over.

Yet, other signs point to a continuing labor shortage if good business prevails and defense cutbacks and controls don't bite deeply into defense and civilian production of the automotive industry.

No Reserve—Manpower in the Detroit metropolitan area is virtually exhausted. An even greater scarcity of available labor exists in outstate areas such as Flint, Saginaw and Pontiac. These smaller cities are major automotive producers but do not have a metropoli-

tan population for a reserve labor pool. The Michigan Employment Security Commission had 20,000 job placements available during September alone.

Also, many defense plants that were under construction by automotive companies in these areas are now nearing completion. It is a matter of growing concern to employment experts how these jobs can be filled.

To complicate matters, old sources of manpower have been tapped repeatedly by automotive recruiters and are now practically non-existent. The South and Southwest, formerly drawn on heavily for assembly line workers, now have labor markets of their own. The tremendous industrial development in World War II and subsequent years in the South has nearly wiped out labor surpluses.

The Army Calls—Thousands of new workers are being lost to the draft each month. Young men of draft age with little or no working experience have long been the backbone of automotive assembly lines.

With nearly all auto companies



"This is an engineer's dream, sir, think of the deep satisfaction you will have when you grind the valves, rebore the cylinders, and shape new sleeves and rods to your own specifications."

now facing a manpower shortage, where will the solution be found?

The best immediate answer probably lies in letting down the bars to potential workers now made ineligible for certain jobs by strict requirements. These barriers may be age, sex, or physical requirements such as size and weight. Auto plants will have to utilize available manpower even if it doesn't meet ideal standards.

Women probably furnish the largest available pool of potential workers. At mid-September there were 75,000 listed on Michigan jobless roles. A large number of these were women who could be used in industry.

Skirting Obstacles—One auto plant is already reviving plans, a World War II program, to hire and train girls for jobs usually filled by men. At the moment this seems to be the exception to the rule.

Another firm has hired men over 65 who were retired from other companies. In general, older men rehired are in the skilled group.

Meanwhile, automotive employment is growing in leaps. Chrysler Corp. had a total salaried and hourly employment of 111,076 in June. Now it is 120,095 and all Chrysler automotive and defense plants are hiring every day. Other companies are doing the same.

Coal Wage Hike Up to WSB

Wage Stabilization Board has scheduled a meeting with coal operators tomorrow, Oct. 10. Purpose is to weigh the facts of the coal settlement,—in other words, find a way to approve the pact which has boosted the basic mining wage more than can be automatically approved under present stabilization regulations.

Increased contribution to welfare fund will not be considered. But Washington talk is that increased productivity by miners—estimated all the way up to 29 pct since 1949—may be used as the way out. Decision must be made early next week if new pay, effective Oct. 1, is to show up in the Oct. 15 paycheck.

ALUMINUM: Set Third Round Goal

DPA wants 200,000-ton-per-year expansion . . . Would boost U. S. capacity to 1,746,000 tons . . . Revised stockpile target is the reason . . . Seek new producers—By A. K. Rannells.

Ending long speculation, the government said last week it was ready to back a third round of aluminum expansion—this time to the extent of an additional 200,000 tons of new capacity.

No government financial aid is planned except as a last resort. But Defense Production Administration is prepared to deal generously in the way of certificates of necessity and fast tax write-offs.

Bowing to the thinking of other government agencies (and some members of Congress), first chance at building the additional facilities will be extended to firms not now in the aluminum business. But they will have to make up their minds and act quickly.

"We propose to issue an invitation to American business firms to send in firm proposals immediately if they wish to participate in this expansion" mobilization director Henry H. Fowler told the Senate-House committee on defense production.

"This committee (has) urged that any additional supply of aluminum capacity found necessary should be obtained from non-integrated domestic producers. DPA will attempt to secure this (new) expansion from new producers—so far as possible."

Is It Needed?—Debate has been raging for several months as to whether more white metal capacity is necessary. Up until now, the target has been a domestic capacity of 1,546,000 short tons of primary aluminum. This figure is double the 1950 output of 719,000 tons.

This estimated production, plus about 550,000 tons of imports and secondary supplies from scrap, would put the available supply at more than 2,100,000 tons. Would this be enough?

Officials at DPA have never thought so and have constantly

talked of more capacity. This opinion was held by former administrator Manly Fleischmann and was shared by his aide and successor, Henry Fowler, now director of Mobilization.

Lost Output—Meanwhile, shortages began to show up as a result of failure of the water supply in the Northwest and South. Aluminum Co. of America alone may lose 4000 tons output in the South during October while the loss in the Northwest is estimated at 7500 tons.

It is safe to say, says DPA, that should the water shortage continue through the whole last quarter, lost production for the last 4 months of the year could go to 60,000 tons.

Also, in late July the Munitions Board raised its goal for proposed acquisition for the national stock-

pile—and so advised DPA. The new stockpile figure, according to Mr. Fowler, has been revised upward.

Hence the decision by DPA, after "thorough and careful" study and "frequent consultations" with other government agencies, including the joint committees staff.

"The huge expansion which would have to be undertaken after the outbreak of a war would impose an almost impossible burden," according to deputy DPA administrator Sam Anderson.

Total Supply—With the additional 200,000 tons for which the DPA is setting its sights, completion would bring total domestic capacity to 1,746,000 tons by Jan. 1, 1955. Estimated imports, largely from Canada, and recovery from scrap would bring the estimated available supply to something like 2,375,000 tons.

Officials at DPA-NPA haven't figured out yet just what they will do to get the 200,000 tons in new capacity if they can't get enough firms outside the "big three" interested.

"We have had a number of firms coming in to talk over such action," one official said. "We feel sure that they will now come in with firm propositions that we can consider."

Even with the decision to add more capacity now, DPA is not satisfied that all requirements could be met in the event of an all-out war. But, officials say, capacity deficit would at least have been reduced to manageable proportions.

Hold Off Planes, Make Autos

Automobiles will be the sole product line, initially, at a General Motors' assembly plant being built at Arlington, Tex., with basic facilities for both auto and aircraft manufacture.

The Navy, which is committed to furnish special tools for aircraft production at the GM-financed plant, originally had planned that a "substantial" number of planes designed by Grumman would be built there. A change in Navy requirements has caused deferment of plane production at Arlington.

Commercial Cold Extrusion

Cold extrusion of commercial steel items up to 30 in. in length and weighing 50 lb will start soon under "Koldflo" process in new Mullins Manufacturing Corp. plant at Warren, Ohio.

Proposed addition will include 20,000 sq ft of floor space for bonderizing, pickling, annealing and sawing facilities. Firm will also add four 3000-ton presses to the two 2000-ton units which have turned out 1 million artillery and mortar shells.

Mullins already has sizeable order for truck and heavy vehicle parts and is negotiating others. Efficient, economical mass production techniques can be applied to cylindrical, precision smooth surfaces without use of alloy steels and with minimum machining.

Engineering experiments also show process effective in production of flanged, square, hexagonal or fluted shapes.

Production

First A-Gun Carriage Off the Line

Atomic warfare moved into the field at Aberdeen proving grounds last July 18 when Dravo Corp. of Pittsburgh shipped the first carriage for the Army's new atomic field artillery piece.

Shipment of parts for the superweapon left Pittsburgh less than 10 months after the formal contract was awarded Sept. 17, 1951. Barrel and breech for the piece, which fires atomic and high explosive shells, were produced at Watertown Arsenal, Watertown, Mass.

Dravo began fabrication of steel plate late last November after a materials procurement program had been set up. Production men first had to process hundreds of blueprints and shop orders for welding, machining and assembly. Establishing operational sequences for assembly and sub-assembly was another stumper. Problem of saving pounds for transportation facility while building recoil strength also kept Ordnance designers and fabricators busy. In addition to a number of lightweight metals, high tensile, carbon, alloy and stainless steels were used.

Assembly Line—Before production Dravo developed special jigs, fixtures to put the operation on an assembly line basis. Sub-assemblies of component parts were then set up in preparation for top carriage assembly. Close tolerances on the sub-assembly line kept workers down to 1/32 of an in.

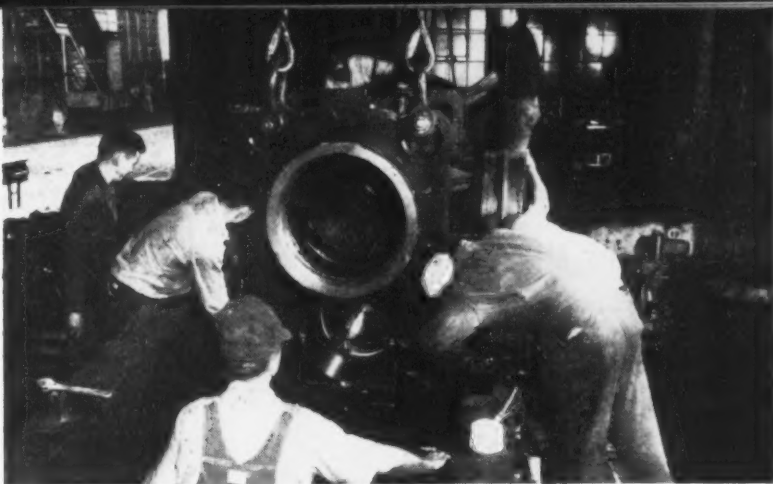
Carriage is 38½ ft long; made up of two double-web girders joined by transverse steel frames. Stainless steel flanges are fixed to the bottom of the girders. Steel castings are welded inside for bearings and gears.

Welding plays a major role in carriage fabrication. Total of 8200 ft is required in one assembly. Each weld is inspected by either Magnaflux Machine or dye penetration process before and after pieces are stress relieved.

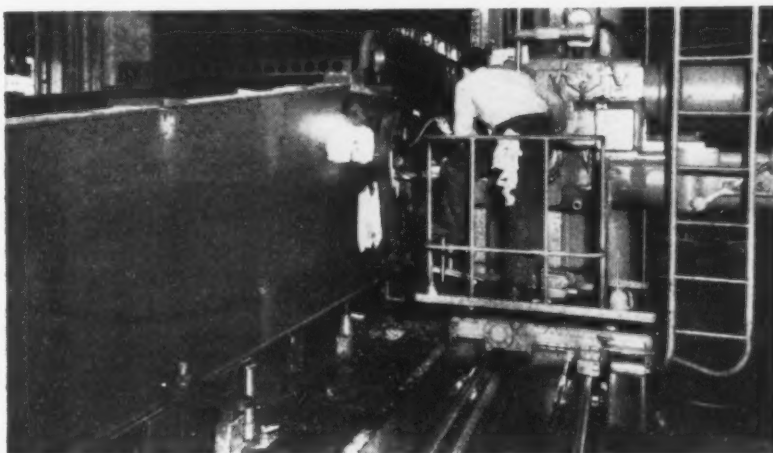
In final welding stages the carriage is rotated 11 times to lessen distortion.

Stainless steel slides were machined on a 26 ft planing machine rigged with a special support fixture. Another fixture was developed to support the cradle tube assembly for planing operations. Cradle tube, a heavy alloy steel casting, was pre-heated and maintained at 700°F before welding to top carriage.

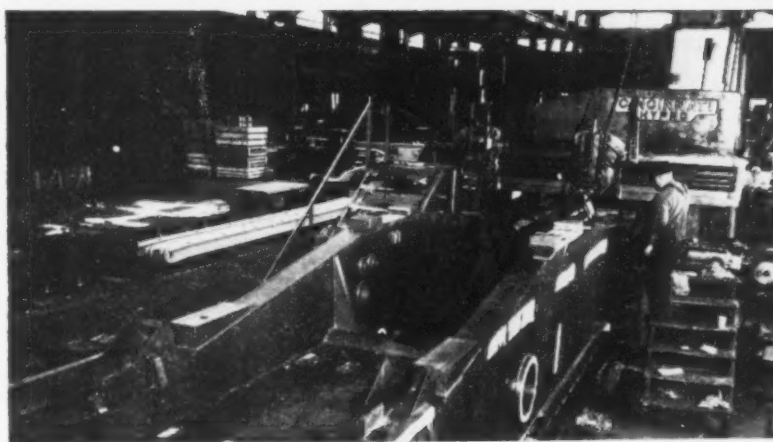
Machining of the rack slide which guides sideways movement of carriage also called for a special fixture to keep cuts on the specified radius. When fabricating operation is completed at Dravo, Ordnance and company inspectors subject the carriages to rigid testing.



ASSEMBLY: Dravo workmen assemble cradle for atomic artillery piece.

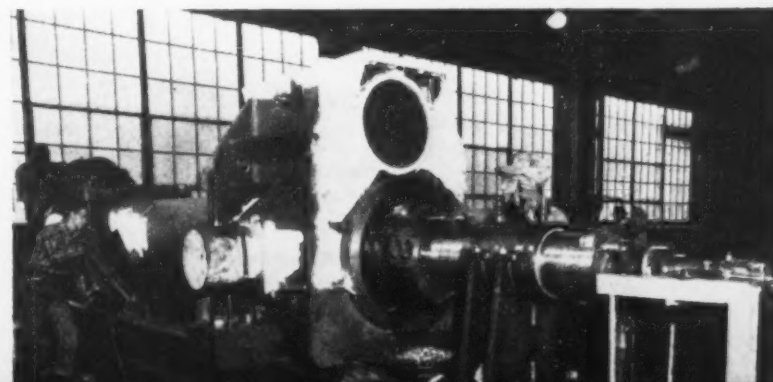


BORING: Gear housings for top carriage are bored on a G & L mill.



MACHINING: A 26-ft planer machines pads and tracks on top carriage.

CONVERSION: Tube assembly was first bored on converted engine lathe.



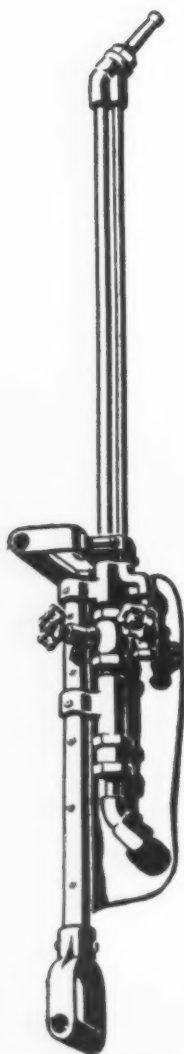
HOW
DO YOU CLEAN
BIG METAL PARTS?

HOW DO YOU
STRIP PAINT OFF
THOSE LARGE
STEEL SHEETS?



I USE AN
OAKITE STEAM GUN
FOR ALL THE HARD JOBS.
IT SAVES
TIME AND MONEY

HOW DO YOU
KEEP YOUR
EQUIPMENT
SO CLEAN?



This happy man has found the answer to all the tough cleaning problems.

He knows the best way to clean metal parts that are too large to be soaked in tanks or conveyed through washing machines.

He knows the best way to strip paint from large parts and large surfaces that can't be soaked.

He knows the best way to clean large equipment such as:

die casting machines
wire drawing machines
blooming mill rollers and cutters
hoisting machinery
brass reduction machines
millers and grinders
buffing machines
forge hammer parts
drill presses
stamping machines
motors



He knows his Oakite Steam Gun will do practically every cleaning job that's too big or too difficult to do by ordinary methods.

FREE For your copy of "Time saved with Oakite steam-detergent cleaning" write to Oakite Products, Inc., 34E Rector St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U.S. & Canada

—Raw Materials—

STEEL: Warehouse

Inventories average 40 pct. of normal . . . Little relief seen until first quarter.

Steel warehouses haven't shown any sure signs of recovering from the poke in the eye administered during the steel strike. Current inventories are estimated at 40 pct of normal—still at the lowest ebb of the entire defense period.

Even worse is the imbalance of inventories. The 40 pct estimate is on a tonnage basis and does not reflect lack of variety.

Prospects of a return to normal are not good just yet. Most warehousemen do not expect inventories to show much improvement until the first quarter of '53, and hope for a return to near normal by end of the second quarter.

Not Adequate — Following a warehouse tour arranged by New York Chapter of the American Steel Warehouse Assn., L. B. Worthington, president, U. S. Steel Supply Div., told newsmen last week, "Steel currently reaching warehouses from producing mills is being readily absorbed by consumers and in most sections of the



NEW PROCESS: For the past year a new process treating uranium and vanadium from local ores, claimed by U. S. Steel, has been installed at the Uravan, Colo., mill of U. S. Steel. The process, just placed in operation, has relieved the company of its capacity.

Supply Short

country the supply is far from adequate to meet demands."

He cited the shortage of large diameter hot-rolled and cold-finished bars and structural shapes and plates as being "particularly severe." Empty steel racks at the Peter A. Frasse & Co. warehouse, Lyndhurst, N. J., and the U. S. Steel Supply Div. building, Newark, the two warehouses inspected during the press tour, substantiated this statement.

Important Outlet—Vital role of warehouses as the steel industry's "retail" outlets is stressed by figures released by American Iron & Steel Institute. Of the 737 million tons of finished steel shipped by steel companies from 1940 through 1951, the largest portion went to warehouses (19 pct in 1951).

Shipments to warehouses during the 12-year period amounted to more than 115 million tons or 16.3 pct of the total. Construction and contractor's products accounted for 14.5 pct of the shipments. Automotive industry was the next largest consumer, receiving 13.8 pct of the shipments.



new process treating high-grade uranium ores was being of U. S. Atomic Energy Commission. Now the Uranium mill has doubled operation relieved the most efficient for recovery of ores, claims company.

Cummins Diesels

ARE PRECISION TENSIONED WITH

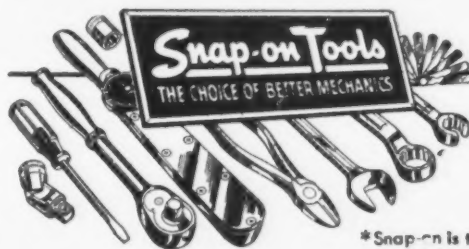


Each Cummins Diesel is built not once, but twice.

One of the big reasons for the high reputation of Cummins Diesels is the extra care Cummins uses in building its engines. For example, each Cummins Diesel is run in after assembly, then completely disassembled for reinspection. Then it is carefully reassembled and tested again. In both assembling operations, Snap-on Torqometers are used to assure complete accuracy of tensioning.

When precision machinery is assembled with bolts, mechanical distortion and excess wear of moving parts often occur if bolts are tightened to unequal or improper tension. To insure correct bolt tensioning, use Snap-on Torqometers... accurate as a watch, yet so easily read that even inexperienced workers can use them.

Snap-on Torqometers are built in 15 standard models, capacity from 0 to 30 inch-pounds up to 2,000 foot-pounds. At-your-elbow service from factory branches in 42 important industrial centers. Write for the Snap-on Industrial Catalog and the 104-page General Catalog of more than 4,000 Snap-on hand and bench tools for production and maintenance.



SNAP-ON TOOLS CORPORATION
8132-J 28th Avenue
Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation

PROFITS: Industry Asks OPS to Help

Manufacturers have streamed to Washington for help in beefing up sad profits picture . . . Pass-through of metal costs forgets labor, freight . . . OPS is stubborn—By R. M. Stroupe.

That continued knocking at the door of Office of Price Stabilization is the sound of irate manufacturers who find nothing in the agency's towering stack of regulations that will guarantee a return to earnings health.

Palliatives offered piecemeal by the agency, in such forms as a "streamlined" application of the earnings standard procedure or a general overriding regulation, are not what industry wants as a cure for a weakened profits position. Pass-through of higher costs for a few basic metals is by no means a solution.

"We Want Relief" — In recent weeks industry representatives have streamed into Washington for conferences with OPS officials, hoping to make plain their conviction that only a price increase compensating for greater costs of labor, inbound freight, fuel, and materials other than steel, copper, and aluminum can insure fair profits.

One example was the presentation by men in the malleable iron castings industry, who underscored the need for adjustments to make up for wages that total between 45 and 60 pct of total production costs.

Among many other complainants are metal lath, foundry, and shipping container industries.

Official response to these pleas, and many like them, has been essentially this: Supply data on earnings to OPS accountants and look for relief under earnings standard rules. If current pre-tax earnings, based on net worth, are less than 85 pct of average earnings in the best 3 of the 4 years 1946-49, with adjustments indicating changes in net worth, then OPS says it's ready to accept applications for higher ceilings.

However equitable this method of providing price relief appears in the official perspective, it contains a pair of pitfalls. Basis of the earnings standard is the belief that 1946-49 were "normal" earnings years and could serve as a base period for industry in general. Another assumption is that the data required for determining eligibility for relief can be obtained simply and conveniently from an examination of operating records.

Depressed Years — Fallacy of the first supposition has been revealed by a number of industry groups, including cement manufacturers and metal lath producers. The former consider 1946-47 as depressed years in their business, and lath producers say they were operating at considerably below capacity in the 4 years 1946-49.

Finding the statistics OPS wants also is a difficult task for some industries, as the steel shipping container manufacturers can attest. Only a small part of this production is done by single-line companies devoting all their effort to container output.

Integrated and multiple-line firms, which must include a variety of production items in their bookkeeping and therefore would

find it hard to isolate earnings on containers, turn out the bulk of these articles.

An industry which can visualize troubles by the gross in trying to get a price increase via the earnings standard route might be tempted to seize on General Overriding Reg. 29 as an alternative. This order makes available a percentage increase over current ceilings for a firm manufacturing an "essential" product. As a basis for the price rise allowed aluminum producers, GOR 29 was adequate, but it's a rare manufacturing firm that can qualify as essential under OPS standards.

Same Treatment — Some industries, reflecting on the price increase permitted steel producers, have wondered aloud why they are not eligible for the same consideration. A committee from the cast iron boiler and radiator industry put this question to OPS and thereby touched on a sensitive nerve.

Its position, OPS asserts in such cases, is that the settlement involving steel was made on specific direction of Office of Defense Mobilization. OPS had no choice. OPS wants to stick to the idea that a higher-than-Capehart price increase for steel did not set a precedent for other related industries.

Essentially, the OPS stand is that of a stubborn opposition to a pass-through of higher costs of labor, while parceling out earnings standards hikes to some qualifying companies. The agency shows it is determined to stand pat on the labor-cost issue, even when earnings studies made now will be out of date in November because of pending wage-boost agreements to be signed shortly.

Of its own future, the agency does not look too certain. A source close to the agency says officials on the next-to-top level believe there is no more need for controls to be maintained now than there will be next Apr. 30. On the other hand, Price Stabilizer Tighe Woods said on Oct. 2 that he is convinced of the need for retaining the restrictions.



"Good Gawsh! Mice?"

NPA: Sees Tight Steel Supply

Administrator McDonald predicts no easing until second quarter . . . Should scrap controls "soon" but won't . . . CMP should be kept till July in case of recurring shortage.

Control officials in charge of both prices and materials seem to be riding a two-headed horse.

They agree on one hand that controls should be junked "as soon as economically feasible," a now somewhat hackneyed phrase in officialdom. At the same time they are making it clear that programs such as CMP are not to be scrapped in the near future.

Administrator Richard McDonald of National Production Authority says he agrees with mobilizer Henry H. Fowler who told the Senate-House committee on defense production that CMP should be continued at least until next July.

One reason, the new NPA chief says, is that if shortages should recur it would take from 6 months to a year to get the system back into operation again. In any event, he adds, there is little prospect for an early balancing of supply and demand for steel, copper, and aluminum.

Not Till Second Quarter—Despite the rapid snapback after the strike and the optimism of the steel industry, McDonald says, the supply won't be brought into balance with demand until well into the second quarter.

The way it looks now, he explains, including 5,500,000 ingot tons of new capacity expected to be completed during last half 1952, steel mills will be kept operating at full capacity until at least next May.

He concedes that the outlook may change somewhat after a meeting with steel officials in late October. First quarter order books will have then been open for a month.

"This will give us our first overall measurement on progress in liquidating past-due tonnage re-

sulting from the strike, as well as the forward position of the mills," he states.

The Picture — Meanwhile, the NPA estimate of the situation is about as follows:

Combined defense and consumer demands will result in continued pressure on large size bars, sheared mill plate, wide flange structurals, and seamless pressure tubing.

Requirements for ammunition types and grades of steel will continue to increase through the first 6 months 1953.

Sheet and strip continue tight at present, due to carry-over tonnage. Indications are that supply will be in balance with "controlled" demand by first quarter.

Tin mill blackplate supply are good with an undersupply of CMP tickets issued for fourth quarter. More will be issued.

Ferroalloy supply is adequate to meet defense requirements but consumer goods industries will continue to suffer as to items re-

quiring nickel, tungsten, cobalt and a few other materials.

In general, as the agency sums it up, the steel situation is brighter. But mixed trends in overall demand as of now indicate that consumers are able to more than absorb all steel output over the next several months.

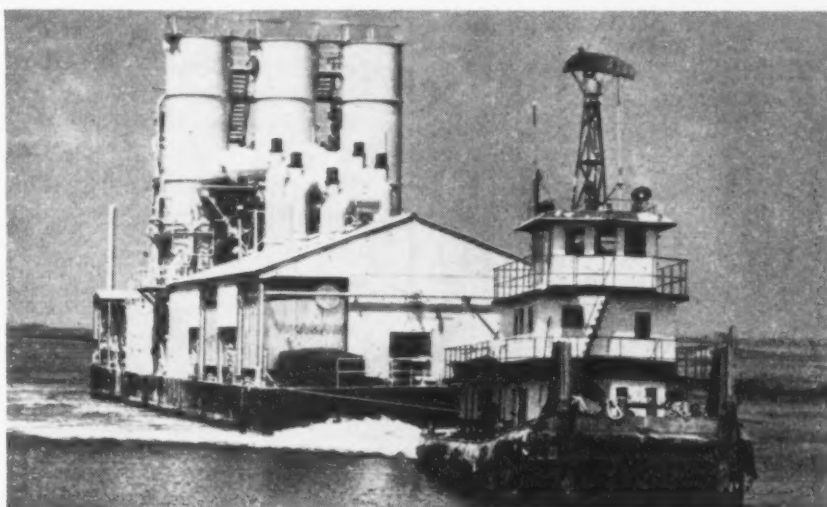
Allow Delivered Ceiling Hike

Manufacturers selling on a delivered price basis and governed by three basic manufacturing regulations now may increase their ceiling prices to reflect higher outbound freight costs on the basis of Office of Price Stabilization actions which became effective Oct. 2.

Those firms with products covered by the General Ceiling Price Regulation, CPR 22, and CPR 30 are in line to benefit by the actions if sales are made on a delivered basis. Manufacturers with a base period practice of selling f.o.b. plant have had and continue to have authority to pass along increases in outbound transportation rates.

Higher carrying costs include increases granted by Interstate Commerce Commission, contract-carrier rate increases authorized by OPS, and higher parcel post rates.

The Oct. 2 actions are Supplementary Regulation 122, GCPR; SR 35, CPR 22; and SR 9, CPR. 30.



FLOATING MINE: A tugboat tows a floating sulfur mining plant 65 miles from Grande Ecaille, La., to Bay Ste. Elaine in the Louisiana Bayou country. It was built for Freeport Sulphur Co. to extract sulfur from marshy area where cost of building a permanent plant would be prohibitive.



THANK YOU, DESIGN ENGINEERS!

Spur
Helical
Worm
Herringbone
Internal
**Coniflex Bevel*
Spiral Bevel
Spline Shaft

*Reg. U. S. Pat. Off.

In a recent survey conducted by DESIGN NEWS Magazine, trade publication for the design-engineering field, 705 design engineers were asked to list the gear manufacturers they would consider when specifying or buying special gears. Of the several hundred gear manufacturers in the United States, The Cincinnati Gear Company was among the first *five* most often mentioned in all categories—and *second* among firms producing custom made gears exclusively. And when you realize that these "first five" firms received over 50 percent of *all* the mentions, the results become even more impressive. The Cincinnati Gear Company actually received many, many times the number of mentions given many other firms having considerably larger production capacities. Such popularity and industry-wide acceptance can only be the result of the constant striving for perfection that has marked The Cincinnati Gear Company's long history—a history of custom craftsmanship of quality gears since 1907. To those design engineers who named The Cincinnati Gear Company in the DESIGN NEWS survey—as well as in their orders and specifications—our thanks! And to those design engineers who are unfamiliar with our company or our product—we invite your inquiry.



"Gears ... Good Gears Only"

THE CINCINNATI GEAR COMPANY

Wooster Pike and Mariemont Ave. • Cincinnati 27, Ohio

Controls

They allow for outbound freight cost increases since Mar. 15, 1951, for CPR 22 and 30 manufacturers and since Jan. 26, 1951, for those pricing under GCPR.

Industry Controls This Week

Alloys—Amend. Dir. 1, Scheds. 1 to 5, M-80 places allocations of alloying materials for melters and processors on a monthly basis.

Coal—Amend. 5, CPR 4 and Amend. 11, SR 13, GCPR authorize an increase of 20¢ per net ton f.o.b. mines on anthracite coal and also permit an adjustment of coke prices.

Coal—Amend. 7, SR 2, GCPR raises prices of anthracite and bituminous coal 25¢ and 35¢ per ton respectively.

Copper—Amend. 2, CPR 110 states that changes in foreign copper prices do not alter ceiling prices set for rolling and drawing services in the copper wire mill industry. Amend. M-16 permits companies that receive quarterly allocations to place advance orders for copper raw materials.

Farm Equipment—SR 34, CPR 22, SR 121, GCPR and SR 1, CPR 161 authorize manufacturers of agricultural and garden hand tools to raise their prices 8 pct.

Machinery—SR 8, CPR 30 provides methods of calculating adjusted ceiling prices under the Capehart Amend. for machinery manufacturers producing custom designed units.

Petroleum Projects—Rev. M-46 and M-463 ease restrictions on materials for small oil and gas industry projects. Delivery-order filing requirements are also relaxed.

Resellers—Amend. 4, SR 4, CPR 7 extends dates on certain pricing orders establishing uniform resellers' ceilings for manufacturers or wholesalers of brand-name items. Amend. 23, Amend. 13, SR 1, and Amend. 1, SR 6, CPR 7 modify retailers' record-keeping requirements.

Steel—Revoc Dir. 1, Sched. 1, M-6A removes the restriction which held warehouse deliveries of aircraft quality alloy steel to 500 lb per month per customer.

Terneplate—Amend. M-25 revokes all restrictions on the use of terneplate.

Defense Contracts

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Letterkenny Ordnance Depot, Chambersburg, Pa.

Body and engine parts for var vehicles, 40 itm, 53-49B, Oct. 8.

Rock Island Arsenal, Rock Island, Ill.

Barrel assy, 1050 ea, 11-070-53-138B, Oct. 17.

General Stores Supply Office, Philadelphia.

Containers, rectangular, metal, 92640 ea, 1-1158B, Oct. 8.

Ordnance Ammunition Center, Joliet, Ill.

Tube, burster, M5 780000 ea, ORD 11-173-53-13B, Oct. 21.

Tube, burster, M19, 642000 ea, ORD-11-173-53-9B, Oct. 14.

Frankford Arsenal, Philadelphia.

Spare parts, gaskets, 15000 ea, ORD-53-SP-25, Nov. 3.

Spare parts for ballistic drive, 100000 ea, ORD-53-SP-19, Oct. 30.

Shafts—centrifugal, 490000 ea, ORD-53-155, Oct. 15.

Watervliet Arsenal, Watervliet, N. Y.

Spring, retainer, 100000 ea, 53-63B, Oct. 15.

Ejector, clip, 160104 ea, 53-63B, Oct. 15.

Alloy steel spindle, part for 155 MM gun M2, 500 ea, 33216Q, Oct. 7.

Steel spindle, assy, parts for 155MM howitzer M1, 3570 ea, 33216Q, Oct. 7.

Aluminum, steel saddle, assy, parts for 60MM mortar M2, 4000 ea, 53-28, Oct. 16.

Aluminum bronze bracket, 8800 ea, 53-28, Oct. 16.

Steel tube, parts for 60MM mortar M2, 4002, 53-28, Oct. 16.

Steel clevis, parts for 60MM mortar M2, 5000 ea, 53-28, Oct. 16.

Navy Purchasing Office, Washington.

Release, torpedo nose, cap, 2497, 6732A-3, Oct. 20.

Dummy nose fuzels for 2.75 in. rocket, 114990, 6733-O-B, Oct. 25.

Supports, conveyors, 7000, 6712-B, Oct. 3.

Projectile plugs, cavity liners cap, 1456408, 6710-O-B, Oct. 28.

Charge suport disc, 1138140, 6736-O-B, Oct. 30.

Blades, hacksaw, 323000, 6744-B, Oct. 16.

VT fuze container mark 90-91, 797378, 6712-O-B, Nov. 6.

Tool sets, 1500 set, 6746-B, Oct. 27.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Replenishment of other motor vehicle parts, 7500 ea, \$66,075, W. G. Avery Body Co., Inc., Jackson, Miss.

Replenishment of tank and combat vehicle parts, 740 ea, \$31,598 Campeau Tool & Die Co., Wayne, Mich.

Replenishment of tank and combat vehicle parts, 150 ea, \$29,716, Clark Cable Corp., Cleveland.

Replenishment of small arms parts, 50000 ea, \$59,500, The Dayton Rubber Co., Dayton.

Replenishment of other motor vehicle parts, 718 ea, \$75,410, Comet Industries, Franklin Park, Ill.

Replenishment of tools, 155 ea, \$110,050, Topper Equip Co., Matawan, N. J.

Replenishment of small arms parts, 7600 ea, \$970,520, Farm-Rite Implement Co., Chicago.

Fire control systems, 290, \$9,908,482, General Motors Corp., Flint, Mich., L. R. Steffen.

Spare parts, \$27,730, Hyster Co., Portland, Ore.

Armored vests, 13000, \$70,850, L. W. Foster Sportswear Co., Inc., Philadelphia.

Modification kit rocket aircraft, 5", M34, assy, 19000 ea, \$198,018, Eisen Bros., Inc., Hoboken, N. J.

Replenishment of other motor vehicle parts, 14000 ea, \$46,284, Bendix Aviation Corp., South Montrose, Penn.

Replenishment of other motor vehicle parts, 1500 ea, \$48,105, Carren & Co., Inkster, Mich.

Replenishment of other motor vehicle parts, 26000 ea, \$50,073, Carter Carburetor Corp., St. Louis.

Replenishment of other motor vehicle parts, 40000 ea, \$51,680, Wagner Electric Corp., St. Louis.

Replenishment of other motor vehicle parts, 1477 ea, \$74,750, Algonac Mfg. Co., Algonac, Mich.

Replenishment of other motor vehicle parts, 4774 ea, \$639,763, GMC Corp., Pontiac, Mich., J. P. McManus.

Radar direction finding assy, 800 ea, \$1,851,512, Hoffman Laboratories, Inc., Los Angeles.

Spare parts, \$78,003, Airborne Accessories Corp., Hillside, N. J.

Generators, 650 ea, \$73,283, LeJay Mfg. Co., Minneapolis.

Electric motors and repair parts for motors, etc., 144088, \$762,047, General Electric Co., Philadelphia.

Repair parts for gas engines, 2000, \$62,487, Food Machinery & Chemical Corp., San Jose, Calif.

Valves and repair parts, 1230, \$35,741, Atlas Valve Co., Newark.

Repair parts for diesel engines, 194, \$44,000, General Metals Corp., San Francisco.

Repair parts for diesel engines, 975, \$30,396, The Cooper Bessemer Corp., Mt. Vernon, Ohio.

Repair parts for interior communications equip, 1263, \$40,924, Sperry Products, Inc., Danbury, Conn.

Repair parts for diesel engines, 7337, \$34,507, General Metals Corp., San Francisco.

Valve assy, 2430 ea, \$35,995, Walter Klide & Co., Belleville, N. J.

Services and material for repairs, var, \$260,000, Piasecki Helicopter Corp., Morton, Pa.

Maintenance parts used on harnesses for engines, 6780 ea, \$64,071, Titeflex, Inc., Newark.

Maintenance parts for R5D aircraft, var, \$57,884, Douglas Aircraft Co., Santa Monica, Calif.

Maintenance parts for carburetor assy, 3852 ea, \$105,879, Bendix Aviation Corp., South Bend, Ind., G. I. Lyman.

Truck, cab and chassis, 19 ea, \$61,499, General Motors Corp., Pontiac, Mich., J. P. McManus.

Truck, cab and chassis, 3 ea, \$17,094, Ford Motor Co., Washington.

Construction

Steel Inquiries and Awards

Fabricated steel awards this week:

150 Tons, Bucks County, Pa., high school building, Max Corchin, general contractor.

460 Tons, Lancaster, Pa., manufacturing building, Armstrong Cork Co., to Belmont Iron Works.

1300 Tons, Portsmouth, Va., power station for Virginia Electric Co. through Stone and Webster Engineering, Inc., Boston, Mass. to Bristol Steel and Iron Works, Bristol, Va.

Fabricated steel inquiries this week:

400 Tons, Philadelphia, bank building for Central Penn National Bank, bids due Oct. 11.

4919 Tons, Agawam and Springfield, Mass. furnishing, placing and painting structural steel for new South End Bridge across Connecticut River, 500 ft downstream from existing bridge. C. B. Raymond, Greenfield, Mass., district engineer. Completion date is June 30, 1954.

Reinforcing Bar Awards this week:

100 Tons, Willow Grove, Pa., Public Works Shop, Willow Grove Naval Air Station, Brothers Construction Co. Low bidder.

100 Tons, Ft. Meade, Md., engineering laboratory for Signal Corps, John K. Ruff, Inc., Baltimore. Low bidder.

Available
for the first time...

**a Full-Color
Sound Film**

**STEEL
WITH A
THOUSAND
QUALITIES**



Scientific schools and groups of designers, engineers, metallurgists and technical societies can now secure the free use of this full-color sound film, the first produced in the steel foundry industry. Available in 16 mm prints, the film is a 37-minute tour of the modern plant of Lebanon Steel Foundry. The camera follows jobs from the blueprints on the project engineer's desk through steps of production to show, finally, a few of the many important uses of Lebanon quality Steel Castings. Write for information on this exciting and educational film.

LEBANON STEEL FOUNDRY
Dept. , Lebanon, Pa.
In the Lebanon Valley

LEBANON
ALLOY AND STEEL
castings



Industrial Briefs

Incorporation—The incorporation of a non-profit foundation for scientific research in pure and applied science was announced by BJORKSTEN RESEARCH LABORATORIES of Washington and New York.

New Press Installed—LAKE ERIE ENGINEERING CORP., Buffalo, has installed a new hydraulic press for the breaking of steel billets used in the production of medium and large artillery shells.

Public Tours Resume—Public tours through the Fairfield Steel Works, Tennessee Coal & Iron Div., U. S. STEEL, have been resumed.

Opening—DENISON ENGINEERING CO., Columbus, Ohio, has opened a branch office at 4306 W. 63rd St., Chicago.

Receives Contracts—A F-BRILL MOTORS CO., Philadelphia, has received over \$3,300,000 in government contracts, mostly for the purpose of remanufacturing motor trucks authorized by the Army.

New Company—Griffin Wheel Co., a subsidiary of AMERICAN STEEL FOUNDRIES, Chicago, will build a railroad wheel foundry at St. Hyacinthe, Quebec. The new company, Griffin Steel Foundries, Ltd., will begin operations in the summer of 1953.

Company Appointed—PRECISION METALSMITHS, INC., Cleveland, has announced the appointment of The Crandall Co. to its field sales organization.

Ice Breaker—Electric propulsion equipment for the U. S. Navy's newest, largest and fastest ice breaker will be built by WESTINGHOUSE ELECTRIC CO., Pittsburgh.

Expenditures—During its fiscal year which ended June 30, 1952, COLORADO FUEL & IRON CORP., New York, spent an additional \$20,040,000 on its expansion and modernization program, increasing its total expenditures on this program over the last 10 years to \$70,896,000.

Business Trip—Top level officers of GENERAL ELECTRIC CO. will leave on a trip which will take them to an unprecedented series of business conferences with nation-wide company representatives.

New Weapon—A new weapon in the fight against high taxes was announced by WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis. The company has revised the record stub on all pay checks so that employees are given the cumulative tax total for the entire year to date.

Sole Distributor—THE NATIONAL SUPPLY CO. announced that it is now sole distributor within the Continental United States for Lister Diesel Engines, manufactured by R. A. Lister & Co., Ltd., Dursley, Gloucestershire, England.

Authority—The Federal Power Commission has given SOUTHERN NATURAL GAS CO., Birmingham, Ala., authority to expand its natural gas pipeline capacity by 40 million cubic ft daily.

Completion—A new transformer plant for Moloney Electric Co., designed by LURIA ENGINEERING CO., has been completed at 4410 Semple Ave., St. Louis.

New Service—A new type service for western industry was announced with the formation of WESTERN INDUSTRY SERVICES, INC., Denver, Colo. The company has dedicated itself to work for the advancement and growth of industry in the west.

Acquisition—Arrangements were completed for the acquisition of all common stock and possession of the plant of Kerotest Mfg. Co., Pittsburgh, by TUBE TURNS, INC., Louisville, Ky.

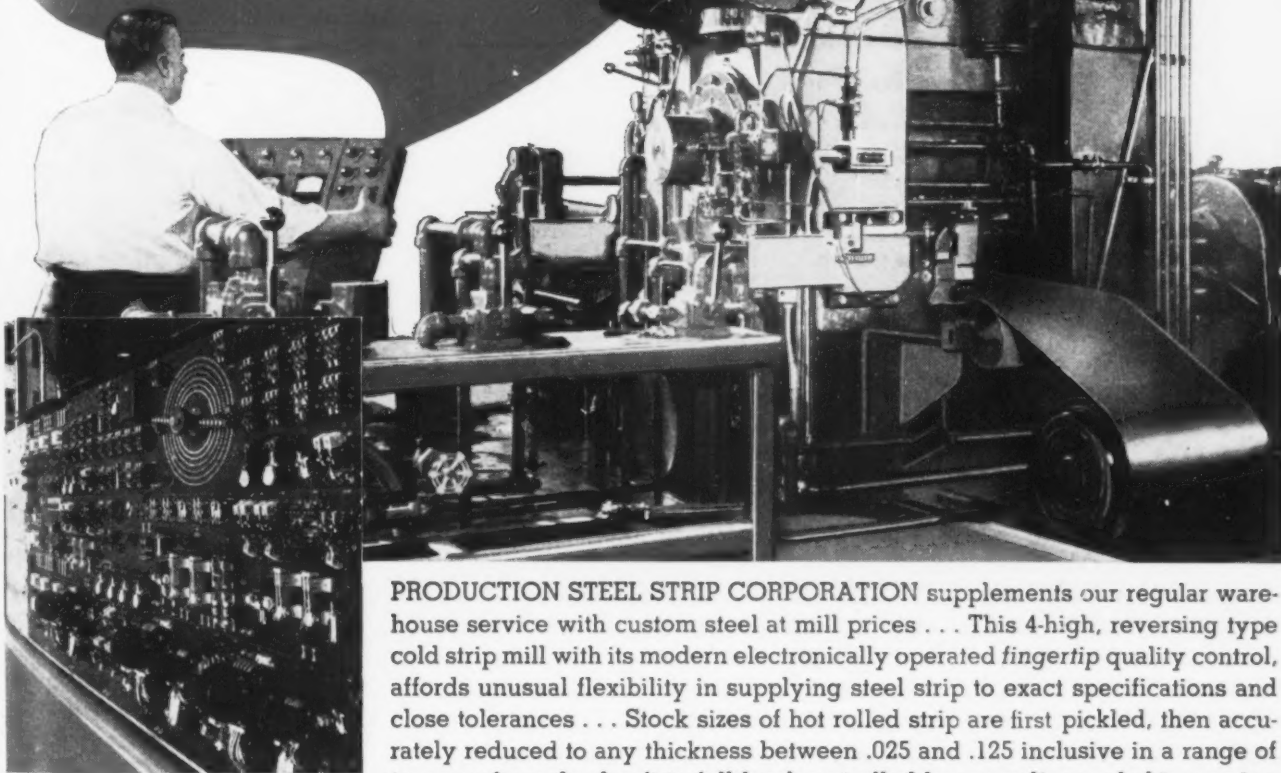
Election—W. H. Kelly, Jr., assistant to the general construction superintendent, Lummus Co., New York, has been elected chairman of the Safety Committee, NATIONAL CONSTRUCTORS ASSN.

Construction Begun—H. M. HARPER CO., Morton Grove, Ill., has begun construction on another plant addition which will house their newly developed Aero Div.

Conclude Negotiations—H. A. BRASERT & CO., INC., has announced the conclusion of negotiations with certain parties in Dortmund, Germany, for the engineering and supervision of construction for a new blast furnace.

We Proudly Announce An **Addition** to
The **PRODUCTION STEEL** Family—
Our **NEW Modern Cold Strip Mill**
with ...

Fingertip QUALITY CONTROL



Main control panel, nerve center
of the rolling operation.

PRODUCTION STEEL STRIP CORPORATION supplements our regular warehouse service with custom steel at mill prices . . . This 4-high, reversing type cold strip mill with its modern electronically operated *fingertip* quality control, affords unusual flexibility in supplying steel strip to exact specifications and close tolerances . . . Stock sizes of hot rolled strip are first pickled, then accurately reduced to any thickness between .025 and .125 inclusive in a range of tempers from dead soft to full hard—controlled by annealing and skin passing to either bright or satin finish and slit to your exact width in coil or cut lengths.

PRODUCTION STEEL

PRODUCTION STEEL COMPANY
2001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

PRODUCTION STEEL STRIP CORP.
20001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

WAREHOUSES:
PRODUCTION STEEL COIL, INC.
20001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

PRODUCTION STEEL CO. OF ILLINOIS
2801 Roosevelt Rd., Broadview, Ill. (Chicago)
Phone: MAnsfield 6-4242

SENECA STEEL SERVICE, INC.
1050 Military Rd., Buffalo 17, N. Y.
Phone: RIVERSIDE 7920

PRODUCTION STEEL COMPANY
1002 E. 81st Street, Indianapolis, Ind.
Phone: BRoadway 3468
E. W. Richardson, Sales Representative

PRODUCTION STEEL COMPANY
548 W. Mechanic Street, Jackson, Mich.
Phone: 2-9097
Glenn Christman, Sales Representative

PRODUCTION STEEL CO. OF ILLINOIS
5226 N. Bay Ridge Ave., Milwaukee, Wisc.
Phone: WOdoduff 2-1205
H. Clive Morrison, Sales Representative

SENECA STEEL SERVICE, INC.
739 Westchester Ave., Rochester, N. Y.
Phone: CULVER 7480
W. J. Knoll, Sales Representative

SENECA STEEL SERVICE, INC.
1347 Northcliffe Rd., Syracuse, N. Y.
Phone: 73-5722
Dean Hethington, Sales Representative

SENECA STEEL SERVICE, INC.
347 Price Street, Jamestown, N. Y.
Phone: 5759
S. N. Olmsted, Jr., Sales Representative

PRODUCTION STEEL COMPANY
1040 High View Lane, Green Bay, Wisc.
Phone: HOWARD 7407
Tony Canadeo, Sales Representative

The Automotive Assembly Line

Method in European Car Building

European small cars better suited for their own market than U. S. models . . . Foreign design superior in weight distribution, attention on rear axle improvements—By R. D. Raddant.

Americans are inclined to scoff at the apparently cheap construction, piddling hp, and tiny size of European automobiles.

A closer look, however, indicates that behind their design and construction may be a background of engineering as ingenious in its own way as that which produces the

"The European industry is realistic," he pointed out. "It attempts to meet the conditions that exist. It does not attempt the impossible task of changing the conditions."

Unlike Americans, who are fast becoming used to power steering, power braking, window lifts and other mechanical gadgets, European

ropean cars were first with independent front suspension and are still ahead of the rest of the world in rear axle improvements.

As Mr. Olley explains it, "Emphasis in America is on directional stability—in Europe on directional nimbleness."

Following are some of Mr. Olley's observations on specific construction details:

Frameless construction is rapidly becoming the orthodox way of building small and medium sized European cars. Five British cars and eight continental models have frameless construction. The important factor in frameless constructions is a 50 to 70 lb weight saving.

In engines, the European trend is to the square shape. British designers are now making a transition from long stroke engines, induced by prewar taxation based on bore size, to short stroke. Two cylinder engines are common and emphasis is on four cylinder engines. Most European engines are built substantially of lightweight aluminum for weight saving.

Good Performance—The Mercedes has a four cylinder, four cycle diesel which Mercedes is making at a rate of 900 a month. By American standards the noise of the engine is "outrageous," but road performance is said to be smooth with instant response to the accelerator. Consumption of diesel oil or kerosene is about 37 mpg, an important factor in gas-short Europe.

Considering high gasoline prices, this factor would rank as important anywhere.

Mr. Olley cautions against judging European cars by American standards. For example, if scaled down to dimensions necessary for European use, the American car would not seat normal size persons. It would be made of the same number of parts and therefore cost almost as much to build.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Oct. 4, 1952	106,983*	31,354*	138,337
Sept. 27, 1952	110,145	31,083	141,228
Oct. 6, 1951	88,485	24,383	112,868
Sept. 29, 1951	84,606	29,367	113,973

*Estimated

Source: Ward's Reports

comparative behemoth of the American auto industry.

The difference, according to a man who should know, is that European cars are designed to meet economic and social conditions that exist in Europe and its market today.

This was pointed out clearly at the Oct. 1 meeting of the Detroit Section of the Society of Automotive Engineers by Maurice Olley, director of research and development for Chevrolet. He started his automotive career in British companies and once served as chief engineer for Rolls Royce U. S. Division.

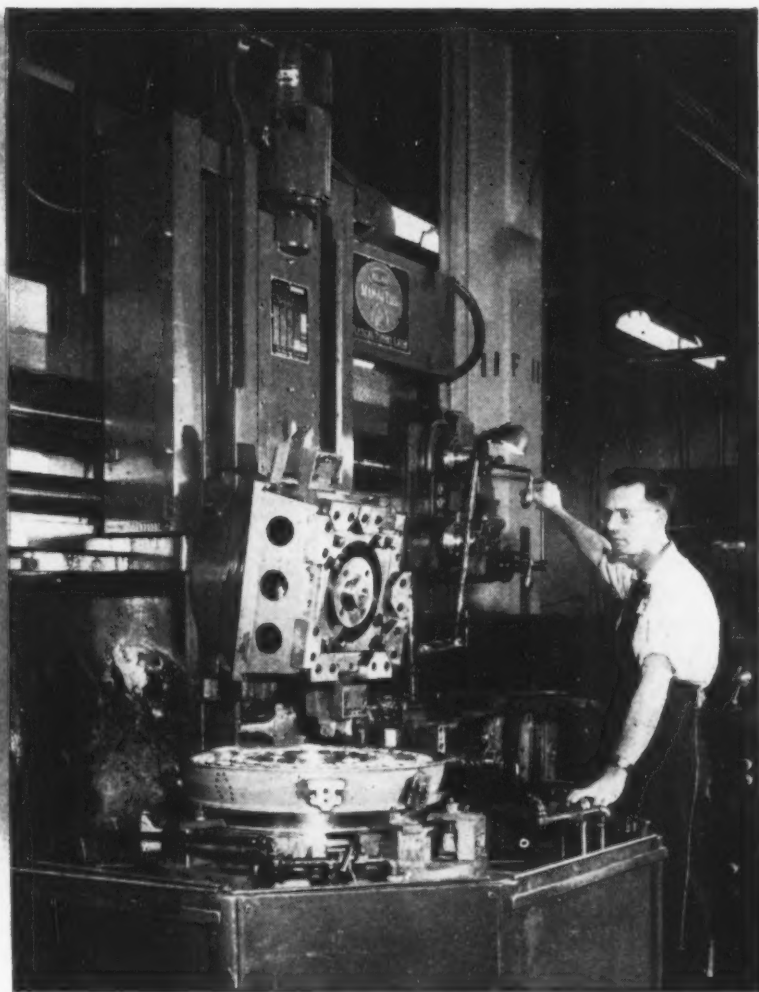
Different Needs—According to Mr. Olley, the interesting features in European cars are not so much in their size, but in the fact that they are made of different materials, put together in a different shape, to meet entirely different conditions of use.

designers must gear their product to a different market. As Mr. Olley put it, "European manufacturers have to keep their imaginations under restraint and think rather how to make a minimum vehicle which their own employees can afford to use. . . . Their primary requirement is a four-wheeled vehicle which will protect them from the weather." In this respect, they appear to be highly successful.

Can American auto makers learn anything from European design?

According to Mr. Olley, Europeans are making much better headway in getting the weight balance between the wheels, instead of piling weight on the front end, and are "hopeful" about developments in replacing the rear axle.

Better Suspension—Because European roads are rough and few corners banked, European demands on suspensions are greater than on U. S. cars. The result is that Eu-



Pacemakers on the *Jet* PROGRAM

The inception of Man-Au-Trol Vertical Turret Lathe started a new manufacturing era in the boring mill field.

Man-Au-Trol manual or automatic control has taken the guess work out of previous manual operations on highly accurate repetitive work.

Automatic change of feeds and speeds at the proper instant, automatic change of direction of feed, automatic precision indexing of heads for succeeding operations — all contribute to the productive efficiency and minimum operator fatigue at a pace previously unobtainable in single spindle machines of the size and capacities of Man-Au-Trol.

For "set-ups" or shorter run jobs, manual operation is quickly available without disturbing the settings for the automatic cycle.

Learn about the manufacturing efficiency of this machine as applied to your work.

THE
**BULLARD
COMPANY**
Bridgeport 2, Conn.

... untouched by human hands!

... to plus-or-minus .035 oz.!

... at 12 per minute rate!

pistons balanced automatically

For the first time, this MORRIS Mor-Speed Production Machine makes piston balancing 100% automatic. Parts are unloaded automatically from a standard conveyor, processed or rejected and returned to the conveyor "untouched by human hands."

Underweight or grossly overweight pistons are automatically rejected without interrupting the production flow. Depending on a cycle time ranging from 5 to 8 seconds per part, production is 450 to 720 parts per hour varying with the amount of metal to be removed from each piece at 80% efficiency and to a plus-or-minus one gram accuracy limit!

MORRIS Automatic Piston Balancing Machines are used by a number of the major automotive producers. If you have a piston production line, let Morris Engineers show you case history proof of time, labor, money and floor space savings.

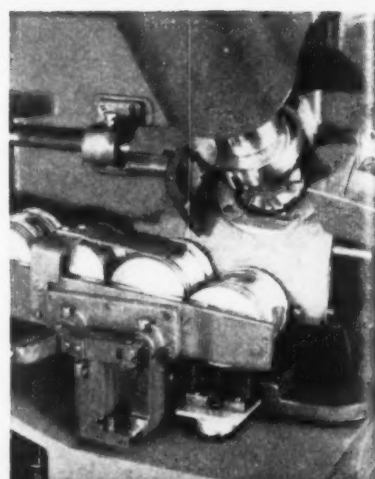
Write today for NEW bulletin describing and illustrating the revolutionary MORRIS Piston Balancing Machine.

The Morris Automatic Piston Balancing Machine takes only 27.3 square feet of floor space to turn out up to 12 accurately balanced pistons every minute!

a better
product
at less cost
with precision
PLUS production



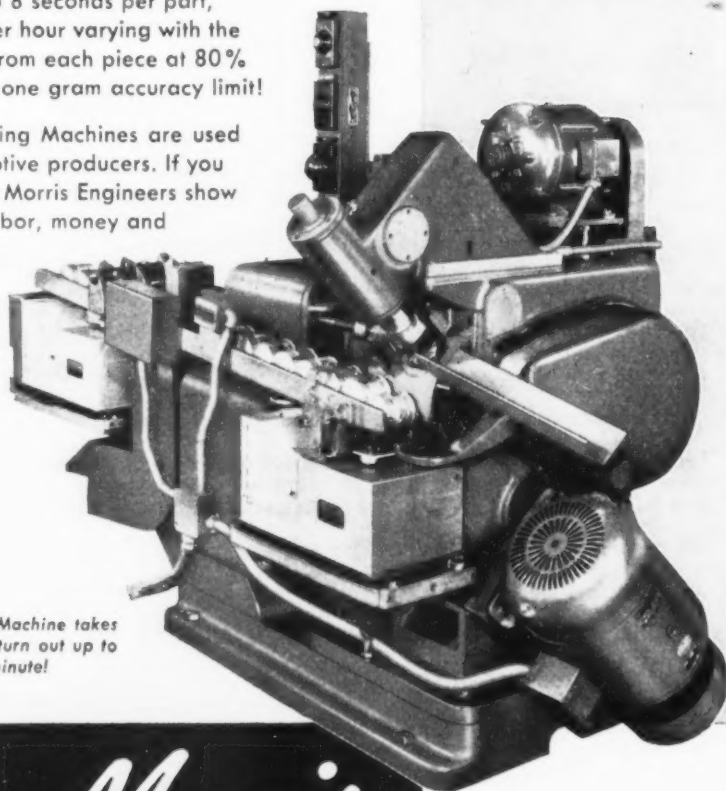
Morris



... by this amazing new

Morris

**AUTOMATIC
PISTON BALANCING
MACHINE**



THE MORRIS MACHINE TOOL COMPANY, 935 HARRIET ST., CINCINNATI 3, OHIO

MARKETING: Era of the Hard Sell

Industry faces most competitive year in a long time . . . Fanfare, major style changes part of high pressure sales era . . . Nash to produce light sports car in '53 . . . Automatic shift.

October will be the critical month in Detroit this year. It will bring in the first of the new models and produce the first indications of public reaction to the 1953 product.

At the same time, the always troublesome cleanup of 1952 models will be in its dangerous period. Dealers and parent companies alike pray they won't be caught with costly inventories. This does not appear to be a critical problem this year, however. Production lost to the steel strike generally wiped out any overflow that might have accrued.

Much Fanfare—Seldom in recent years has the introduction of the new models been accompanied by such a buildup in advance of first showings. Sales forces in all companies have been alerted, drilled and trained for what may be the first year of real competition in some time.

The industry has to look back only to early 1952 to recall the signs of market softness that threatened to make controls an academic proposition before the steel strike paralyzed the industry.

In almost every segment of the industry, major if not radical changes in styling, some new engines, and introduction of sports cars are expected to stimulate buying interest.

High Pressure—If the interest doesn't come naturally, the motor-ing public can look for sales techniques as aggressive as ever experienced. Sales executives mean it now when they warn that the days of waiting for customers to drop in are over.

One auto executive said pointedly that his sales force would

have to employ vacuum cleaner or life insurance sales techniques with the persistent followup. His formula: Ten calls produce one request for a demonstration. Ten demonstrations produce one sale.

Sports Cars—Nash Motors is readying plans to jump into the light sports car race late in 1953 with production of its NXI that was first exhibited 2 years ago.

The new car will be built by two British firms for distribution in U. S. and Canada. Fisher and Ludlow, Ltd., will build the bodies and Austin Motor Co. will provide chassis and final assembly.

Nash spokesmen say that the new car will follow the modern "Airflyte" construction principles

despite its being built abroad.

NXI was originally shown early in 1950 when it was billed as a "\$1000 or less" convertible. It is a small two-passenger car with low sleek lines. The production car will be slightly larger and more powerful with a 42 hp engine and 85 in. wheelbase.

Automatic Shift—When torque converters and other automatic shifting applications hit the automotive industry, the general opinion was that the only field of development was in the direction of passenger cars.

Now it appears that tests of torque converters applied to heavy-duty trucks and off-highway vehicles have advantages of an opposite nature.

Instead of saving the driver the trouble of shifting, some tests have indicated that torque converters on heavy-duty vehicles have actually improved the life of the entire power train while also showing improved performance.

THE BULL OF THE WOODS

By J. R. Williams



The cutting edges of a DYMON-IZE*
ground broach look like this, when
enlarged 50 times.



Minute jagged edges are characteristic
of conventionally ground broaches
(same enlargement).

Specify DYMON-IZE* ground broaches and get

LONGER BROACH LIFE & SMOOTHER SURFACE FINISH

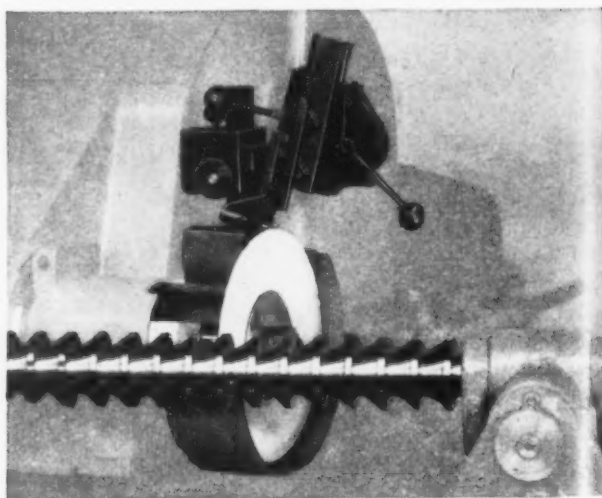
The smoother cutting edges and tooth rakes of DYMON-IZE*
ground broaches mean longer broach life, smoother chip flow,
and smoother surface finish on broached parts.

All Colonial internal broaches are now available DYMON-IZE*
ground at no extra cost.

Specify "DYMON-IZE Ground" on your prints.



★Registered
Trade Mark.
Patents
applied for.



DYMON-IZE* units are also available for use on your
broach grinders to insure that your broaches will give
you the same peak performance after sharpening as
when new. Ask for DYMON-IZE Bulletin #DS-52.

Must Keep Modified Material Controls

Many shortages have eased . . . But modified controls are needed to insure defense schedules . . . Much war money still is unspent . . . Are we Buying American?—By G. H. Baker.

A good many, but not all, of the worst raw materials shortages have been overcome, but some modified system of controls will have to be continued to insure defense production schedules for many months to come.

This is the theme of the seventh regular quarterly report (covering third quarter 1952) to the White House from Office of Defense Mobilization, now headed by Henry H. Fowler.

As background, Mr. Fowler points out that Congress has appropriated \$129 billion for defense and military construction and procurement purposes since Korea. About \$99 billion has been spent or committed.

Commitments Top Deliveries—

The catch is that out of this vast amount, only \$41 billion (including construction) has been completed and delivered leaving \$88 billion, including \$30 billion as yet unspent, in various stages of processing, on order, or contract letting.

This means that two-thirds of the defense spending to date is yet to be translated into services or manufactured goods and delivered. This apparently is the basis for statements that defense production is not yet at peak.

Mr. Fowler says, that priorities powers will be necessary beyond next July—when the present Defense Production Act expires—if defense and military orders are to be delivered on schedule.

And in order to assure the proper working of the priorities system in getting materials, tools, and components to the right destination, there will have to be a supporting control system, at least on a standby basis.

Machine Tools Okay—A bright spot from the government's standpoint is that except for a few types of special purpose items, the machine tool outlook is no longer a headache. Backlog of orders has dropped from 23 months to an average of 12.

No immediate thought is being given to urging further steel expansion. A total of 13 million tons of new capacity has been added since Korea, the report states.

This means that the industry has completed 56 pct of the new capacity required to meet the government's recommended goal of 123 million tons by 1954—enough to assure an annual production sufficient for war and industry.

Airborne Titanium

About 530 lb of sheet titanium—instead of sheet steel—are to be used in production of certain airframe parts for the B-36 bomber.

Both military agencies and commercial firms have performed extensive research on titanium, which has excellent resistance to heat and corrosion. In non-structural uses, when replacing steel on a gage for gage basis, it can produce a weight saving of as much as 40 pct.

Scheduled date for a phase-out of B-36 production is 1954. The Air Force expects to use titanium in other aircraft, but cautions that more development work must be done before it becomes a common item in plane production.

By initiating use of titanium in the B-36, the Air Force hopes to open the way for greater demand for the metal.

May Need More—Latest increase for aluminum is an extra 200,000 tons to be built by 1955. Present thinking is that by that time it may be necessary to raise the sights again, perhaps as much as another 400,000 tons to be built in the following 3 years.

Electric power requirements, previously estimated at 107 million kw, are now seen as being too low by at least 10 million kw. The new target is 117 million kw by 1956, a 2-year extension of the completion schedule.

Efforts will be continued to get petroleum expansion on its feet. The government's goal is 50,000 to 55,000 new wells a year but indications are that drilling this year will not get beyond 45,000 new holes.

Likewise, efforts will be made to get freight car and locomotive production programs back on schedule. Present production rate is a sore disappointment to ODM. Freight car production this year has averaged less than 7000 units a month against the 10,000 rate deemed necessary.

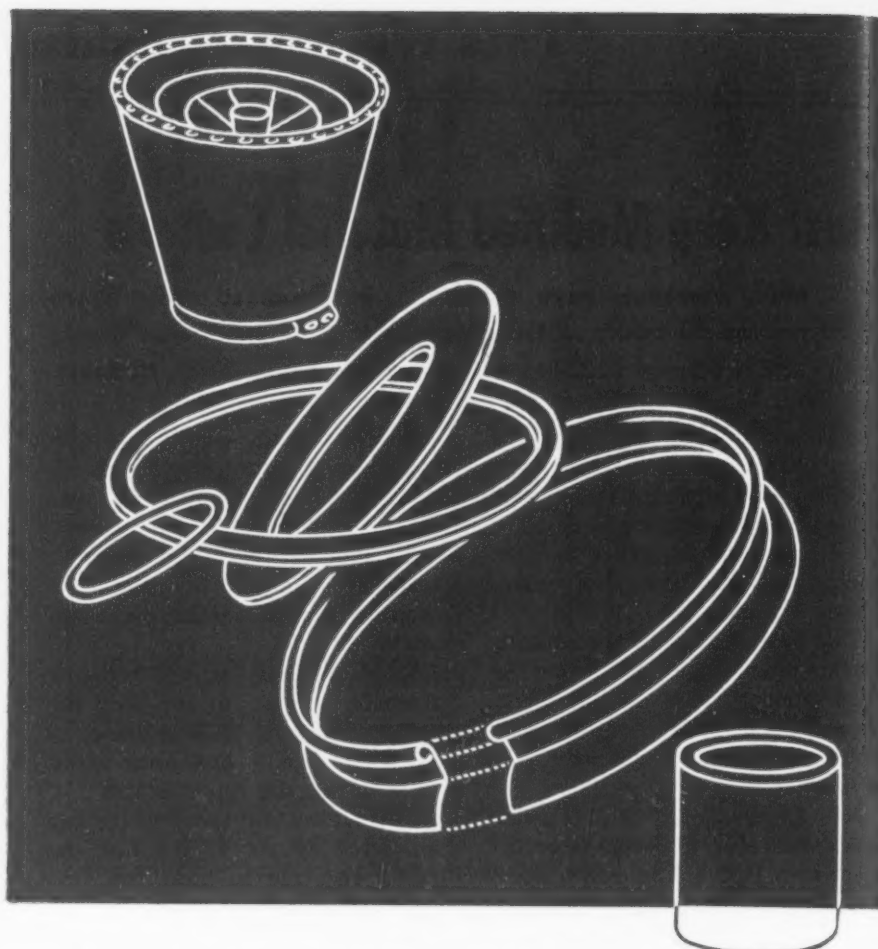
Under the revised target, the production rate was to have gone up to 11,000 monthly as of October.

Buy American?—Circumvention of the so-called "Buy American" law by Pentagon planners is arousing the wrath of industrial area congressmen.

Little or nothing can be done to change the situation until the new Congress convenes in January. But mounting protests from manufacturing areas, particularly in the East, are forcing a showdown as to whether or not Congress meant what it said in the "Buy American" act.

"Ashamed" of Move—Move to suspend, in effect, the law was agreed upon jointly by the Defense Dept. and the State Dept. But Defense Dept. officials say privately that they are "ashamed" of the move, and claim it was "foisted off" on them by others.

GO
"AMERICAN"
FOR
CIRCULAR
WELDED
PRODUCTS



If any of your requirements lend themselves to any welding process, we believe that our 34 years of welding and fabricating "know how" put to work for you will provide you with worth-while manufacturing economies. All you have to do is drop us a line.



THE

AMERICAN WELDING &

MANUFACTURING CO. • WARREN, OHIO

Send for your copy
of our 20 page
illustrated catalog

LET US SEND YOU MORE FACTS OR
BETTER YET SEND US YOUR SPECIFICATIONS
FOR PROMPT QUOTATIONS



METALS: Are We Meeting Our Goals?

Expansion aid from Washington seen as big factor in pushing up production of metals and minerals . . . Expect 40 pct iron ore increase . . . List other targets—By A. K. Rannells.

Government aid has been thrown behind more than \$1 billion worth of industrial expansion for production of metals and minerals.

Another \$500 million in government aid applications for mining expansion has passed initial screening and is being seriously considered.

These are the latest tabulations by Defense Materials Procurement Agency. Government assistance includes tax certificates, loans, purchase contracts, advances against production, etc.

Iron Ore—The government expects that this aid will yield at least \$1.1 billion worth of new production by the start of 1955. Increased production of iron ore is a major target, officials say. Here, the target has been set at a 40 pct increase above 1950. Estimate of 1955 requirements are set at 147 million tons.

This includes production from foreign mines operated by domestic companies.

These figures do not include production of taconite, sintering, or other improved techniques for treating low grade ores. A program is underway to build up taconite output to about 15 million tons by 1955.

Coke — The Materials Policy Commission recently reported that expansion of coke production should be pushed. About 120 million tons may be needed by another 15 years.

Present goal is to get chemical coke capacity up to 84 million tons by 1955, a net increase of 10 million tons.

Most of the \$677 million in coke industry applications for tax certifications have been processed (104 applications). The net result is certification to date of \$550 mil-

lion in new facilities, about \$423 million going to integrated facilities, \$125 million to non-integrated, and \$2 million to beehives.

This covers an additional 17.5 million tons of new capacity. But this will be offset by loss of 10 million tons of old capacity between 1951-55, leaving close to 3 million tons of new capacity needed.

Manganese — Government planners have also established a goal of 2.5 million long tons of metallurgical grade manganese ore for 1955. This would call for an increase of 30 pct, or 630,000 tons, above the 1950 supply.

The total government program has worked out expansion goals for 17 different metals and 22 non-metallic minerals. Industry has submitted nearly 1900 applications for expansion aid.

Of this total, 469 had been okayed and put into operation by the middle of September. Some 671 had been denied, and the remainder were in various stages of processing.



"In case of a power failure."

Some goals, such as for lead and zinc, are assured. But others range downward to 70 pct complete, a few even less. A brief summary of major programs follows:

Molybdenum—Expansion by 130 pct in domestic production (over pre-Korea) by 1955. Target is in sight.

Fluorspar—Goal calls for 50 pct increase in production. Already covered.

Nickel—A minimum increase of 35 pct by end of 1954, plus further expansion after that date. Goal partially in sight through reactivation of Nicaro facilities, loans, and tax certificates.

Copper—Goal by 1955 is 25 pct increase. In sight as result of subsidies (over ceiling prices), and other government aid. High cost mines are operating, plants have been expanded, and new properties are being opened up.

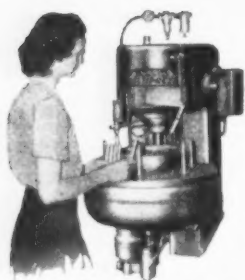
Zinc—Sufficient tax certificates have been issued and purchase contracts made to guarantee the proposed target increase of 15 pct in production through the next 2 years.

Lead—Target was only a 2 pct increase. Government has bought up 26,000 tons, will buy 4000 more.

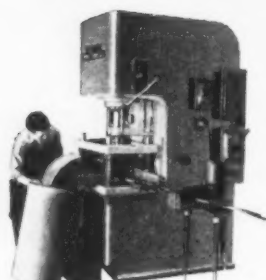
Awards for War Production

Harold R. Austin, Munitions Board vice-chairman for Production and Requirements, heads a new 4-man Defense Dept. body set up to determine standards for production awards and to select those industrial firms winning such awards.

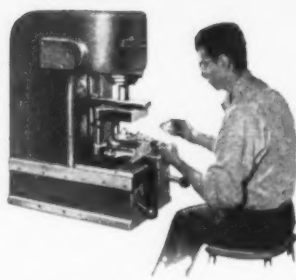
Comprised of one representative each from Munitions Board, Army, Navy and Air Force, the Production Awards Council will offer public notice of achievement by defense contractors in a program resembling that which produced the Army-Navy "E" awards of World War II.



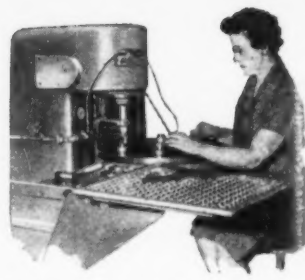
Assembly speed is doubled using Multipress to crimp a small brass contact to pen-type flashlight cases



20,000 mop clamps a day is cost-cutting speed of 35-ton Multipress using roll-feed and 4-stage dies



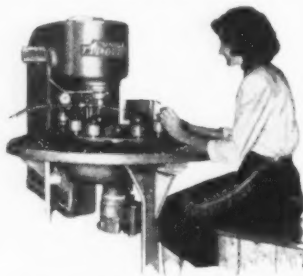
Dies stay sharp twice as long when Multipress is used in trimming flash and gate from die castings



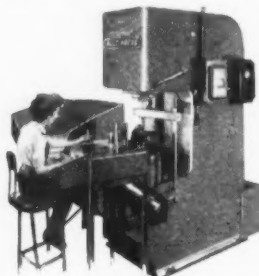
Scrap losses drop sharply as Multipress doubles staking speed on high precision voting-machine counter wheel



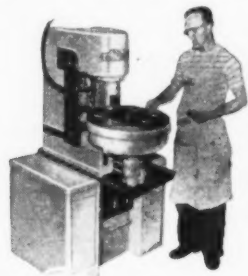
Six hours saved on every 100 finished units as famous electric cleaner plant adopts Multipress to clean cast housings



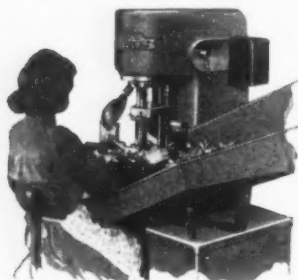
Output is boosted by 100% by famous toy train maker, staking 6-part assembly together with Multipress



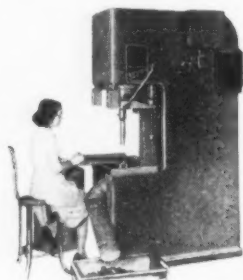
At twice the speed of previous method, Multipress assembles bolts on electrical insulator holders



1600-per-hour rate slashes production costs when 4-ton Multipress is used to broach serrations on small cams



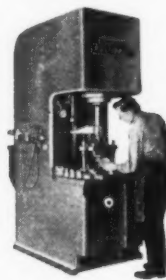
No down-time for repairs in 7 years for Multipress used to bend tabs and arch locks on steel clamps at high speed



Speed doubled on delicate job of drawing thin phosphor-bronze tubes used in forming sensitive thermostat bellows



Less operator fatigue noted as Multipress Midget assembles two check valves to main valves at 450 per-hour



In only four stages, Multipress deep-draws a precision ordnance part formerly requiring 8 draws

Speaking of Trends... **MULTIPRESS**®

Thousands of actual Multipress installations prove that its smooth, oil-hydraulic power control is the surest answer to growing demands for faster production, better quality control, quicker tool changing, safer operation, and lower scrap losses.

It offers complete, stepless adjustability of ram speed, pressure and stroke length. Manual and automatic models in a complete range of sizes and capacities up to 50 tons.

Pressures build up instantly after the ram contacts the work. There's no hammer-blow impact on either the work or tooling.

With Multipress Index Table Feeds, parts or assemblies can be loaded on fixtures at several points

around the table dial — by two or more operators, if necessary. The fixtures index automatically under the press ram at speeds up to 70 per minute.

Automatic time delay, for ram dwell or hold-down needs, is easily provided with Multipress.

In fact, Multipress offers such a wide choice of valving, ram controls, auxiliary feeds, operating accessories, and tooling attachments — all easily interlocked with the press ram action — that it has become one of industry's most versatile tools for low-cost production and assembly.

Write for complete Multipress information today.

The DENISON Engineering Company

1158 Dublin Road, Columbus 16, Ohio



West Coast Report

Western Mills Help Out Detroit

Consumers can use all steel they can get, but rolling mill space is short . . . Excess ingots shipped to other plants for finishing as auto items . . . Foundry growth—By T. M. Rohan.

Western steel mills, traditionally in a deficit area, are giving a helping hand to steel-starved Detroit. A major West Coast mill with temporary excess ingot capacity is shipping ingots on an initial 12,000-ton order to Colorado Fuel & Iron Works at Pueblo, Colo. C.F.&I. is rolling the ingots into 4-in. billets for shipment to General Motors to make crankshafts. C.F.&I. has had temporary excess rolling capacity due to slow start-up after the strike and installation of mechanization equipment.

Other inter-regional shipments of ingots and billets are also being made by Isaacson and Seidelhuber in Seattle. Seidelhuber made a token shipment of steel for tubing last month and Isaacson is sending some tonnage to U. S. Steel.

Hard-up western consumers could now use every pound of steel made, but the mills did not have rolling time to finish the excess ingots.

Shell Molding—In the wake of Stanford University's shell molding machine, unveiled 2 weeks ago, a small production model, believed to be the first of its kind in the West, showed up last week in Vallejo, Calif.

Vallejo Brass & Aluminum Co., a 2-man job shop huddled away in a government surplus plant, had understandably eluded the search by Stanford and western manufacturers for operating data on the Croning process.

M. H. Madiros, who is Vallejo Brass & Aluminum, has been turning out 100 shell molds per day for 3 months. He manufactures 2-lb aluminum bases for a unique telescoping light for police and

emergency vehicles. He has an old gas-fired core drying oven necessitating a 3-min cycle.

Mr. Madiros went into shell mold production to replace conventional sand cores. With shell molding he was able to furnish castings with a 12-pitch, 1½-in.-diam thread and four mounting holes for the same \$2 per unit price as previous rough sand castings which needed \$1 worth of threading and hole-drilling.

Steel Propellers—Experimentation is now under way on stainless steel propellers to replace bronze. Although common in smaller sizes,

difficulty of holding close tolerances in casting has largely prevented use in bigger ones. Some pioneering work has been done on machining propellers at the Philadelphia Navy Yard, but costly manual chipping and sanding is still the conventional finishing method.

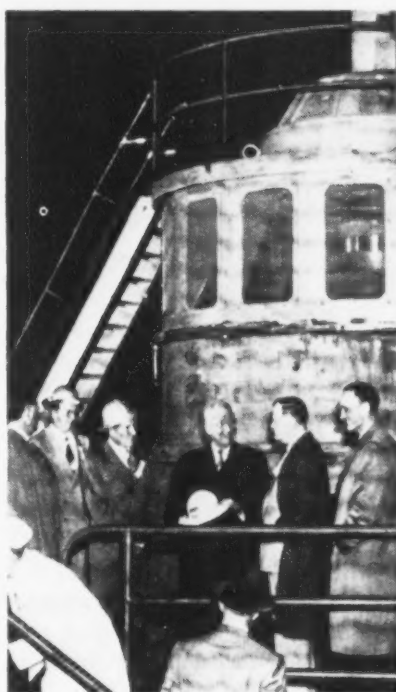
Mare Island foundry has cast 13,000-lb, 10-ft-diam, 6-in.-thick bronze disc. Major operational problem is converting production line foundrymen to constantly changing job shop work traditional in Navy repairs.

Shipyard Expansion—New 11-ton Whiting tilting-type electric and 1500-lb Electromelt furnaces are now being installed at the Navy's Mare Island Shipyard in a general foundry expansion and mechanization program.

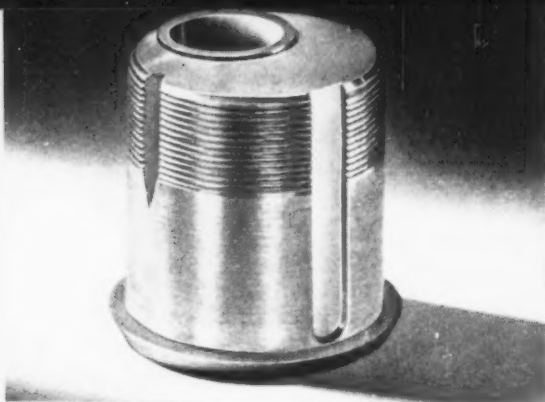
The foundry's biggest existing furnace is an 1800-lb unit which is supplemented by small indirect arc furnaces. Other new equipment pending final OK includes a dielectric sand core drying oven and 3000-lb Detroit indirect arc furnace. The foundry, employing 180, specializes in job shop repairs and is western headquarters for making Navy propellers.

Scrap Indictment—Early last March Office of Price Stabilization agent Robert Ewing in Seattle, posing as a scrap iron dealer, reported he was paid prepared scrap prices for unprepared material at Northwest Steel Rolling Mills. One delivery was 3000 lb, the other 4730.

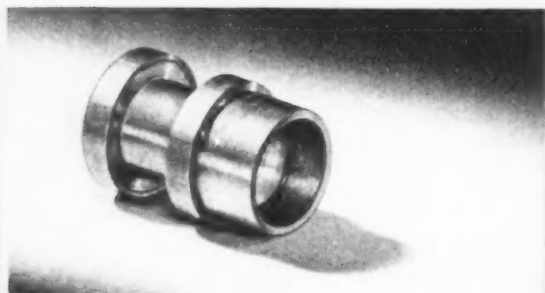
Last week in Seattle OPS got a federal grand jury indictment charging the firm and two weighmasters with price violations. Rumor had it others were also in the offing. Other dealers were quick to point out the government apparently illegally sold scrap over ceiling and that the unprepared scrap was hidden in with prepared lots.



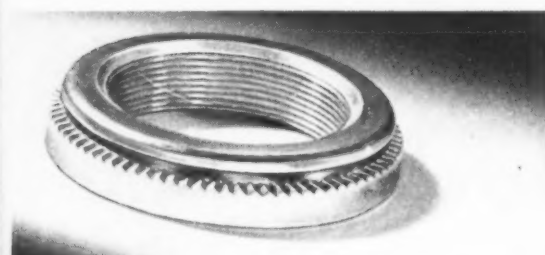
MORE POWER: President Truman gets a closeup view of huge dynamo at Hungry Horse Dam which he dedicated last week.



LOCK CYLINDER. Metal: 1 $\frac{3}{8}$ " dia. brass
• Machine: model 601 New Britain Gridley
• Operations: *crossslide*—rough form, finish form, break down cut off, side mill, vertical end mill, final cut off; *tool slide*—face, drill offset hole, ream and counterbore offset hole, thread
• Spindle Speed: 1,324 rpm • Feed: .006" per revolution • Tools: high-speed steel • Cycle Time: 7.3 seconds



CARPENTER'S PLANE PART. Metal: $\frac{9}{16}$ " B1113 steel • Machine: Brown & Sharpe Automatic Screw Machine • Operations: *front cross slide*—form; *rear cross slide*—cut off; *turret*—feed stock, spot drill, drill $\frac{13}{32}$ " hole, tap drill, reverse spindle and tap left-hand thread
• Spindle Speed: 1,180 rpm • Feed: .0025" per revolution • Tools: high-speed steel • Cycle Time: 30 seconds



KNOB INSERT. Metal: 1 $\frac{7}{8}$ " round aluminum
• Machine: model 61 1 $\frac{3}{8}$ " New Britain Gridley
• Operations: *cross slide*—form, knurl, cut off; *tool slide*—spot drill, tap, ream, recess • Spindle Speed: 1,600 rpm • Feed: .005" per revolution • Tools: high-speed steel • Cycle Time: 7 seconds

SUN OIL COMPANY, Dept. 1A-7.
Philadelphia 3, Pa.

I am having trouble possibly caused by an inadequate cutting oil. I would like ☐ the services of a Sun representative; ☐ the booklet "Cutting and Grinding Facts."

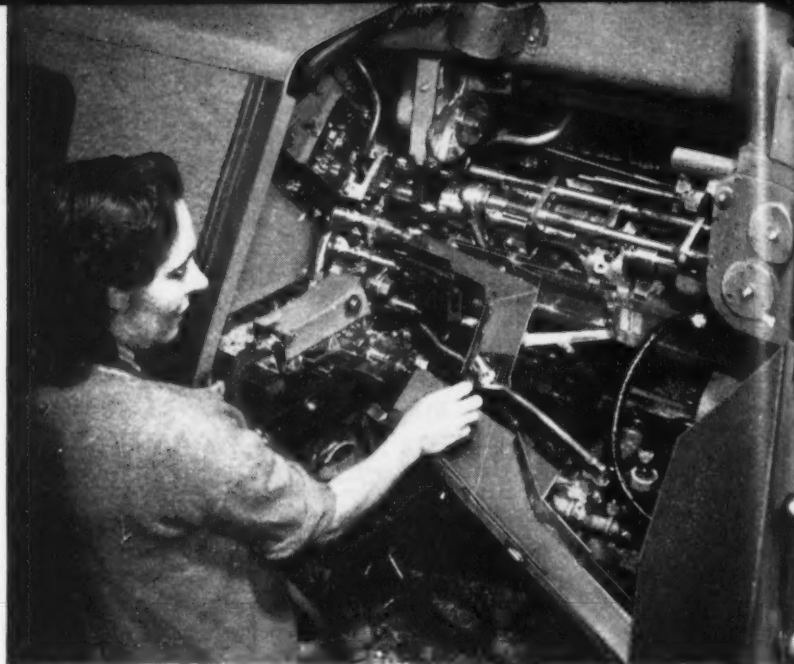
Name

Title

Company

Street

City Zone State



MORE THAN 300 PARTS ARE MACHINED with the aid of *one* cutting oil for tools and hardware items made by Sargent & Co. Raw materials worked are: B1113 steel, 11ST-3 aluminum, ASTM-B140-46 Type B half-hard bronze, B16-46 brass, and Type 416 stainless steel. Stock ranges from $\frac{1}{16}$ " wire to 2" bars.

SINGLE GRADE OF SUNICUT REPLACES 4 CUTTING OILS

A good example of cutting-oil economy and efficiency is provided by Sargent & Co., well-known hardware and tool manufacturers. Their complete line requires the machining of more than 300 parts from a wide range of metals. A few years ago this company was using four different cutting oils, purchased in drums. By switching to a single product, Sunicut 11W, and buying it in bulk, Sargent has been able to effect an annual saving of about \$3,000. All operations are performed as well as before, or better—and shop efficiency is up.

Sunicut 11W is a low-viscosity, dual-purpose cutting oil for automatics machining all nonferrous metals and free-machining steels such as B1112 or B1113. Its transparency permits quick and accurate miking. It will not stain brass or copper under normal conditions. It drains rapidly, minimizing carry-off. And its high lubricating and cooling properties aid in prolonging tool life and improving finishes. Moreover, it protects finished parts from rust and corrosion.

Other Sun cutting oils offer similar opportunities for improved operations and economy. For information about them, or the help of a Sun representative, use the coupon at the right.

SUN INDUSTRIAL PRODUCTS
SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO & MONTREAL



Machine Tool High Spots

Safety Valves for Production

Tool output must be maintained at adequate level for quick shift to all-out effort . . . NPA outlines ways . . . Pool orders, stockpiling, tax revisions suggested—By E. C. Beaudet.

To meet the demands of an all-out war, machine tool production must be kept high enough to permit the industry to shift to full mobilization output without delay. Proposals for maintaining this level were outlined last week by Ralph Howe, director of National Production Authority's Metal Working Equipment Div.

Speaking before members of the American Machine Tool Distributors' Assn. in Virginia Beach, Mr. Howe reflected NPA's views on pool orders, expansion of facilities for long term equipment and revision of depreciation laws.

Can't Go On—While the industry is expected to maintain a good volume of business until the middle of next year, builders of small, short lead-time tools are already feeling the pinch of defense cut-backs and contract completions. Present shipment rate of more than \$100 million worth of machine tools per month cannot be maintained for long. But the industry must continue to produce enough to keep its labor force intact in case of an all-out war.

Builders of small machine tools will have to find their own production levels once the impact of defense buying has passed, and they prefer it this way, Mr. Howe said. But the problem of what to do about firms whose business falls off so badly that they are unable to keep their labor force intact must be anticipated. Mr. Howe suggested machine tool pool orders as the solution.

Tool Pools—Since the government knows which types of machine tools are in greatest demand in war time, pool orders covering

these tools could be drawn up. They would be activated only for companies whose business fell below the level required to maintain its skilled labor force.

Orders would be given in certain quantities and normal production lots. The amount of business a firm would have to lose before it became eligible for a pool order would vary with each company. It is estimated that 50 pct of present production would be the critical point for some companies.

To expedite production of machine tools in an emergency, particularly long lead-time equipment, Mr. Howe suggested that pool orders should be given by the government for certain components and materials such as forgings, bearings, clutches, castings, etc. These would be bought by the government and stored and maintained in builders' plants. In the event of full mobilization they could be drawn from these reserves and put into production. Government investment would be minor but it

would save from 5 to 6 months production time.

More Incentive—Present backlog of long lead-time tools for defense is still heavy and some delivery dates will not be met, Mr. Howe stated. To solve this problem a thorough analysis of delivery requirements must be made to put them on a more realistic basis. In addition, the government must offer builders more incentive to expand facilities.

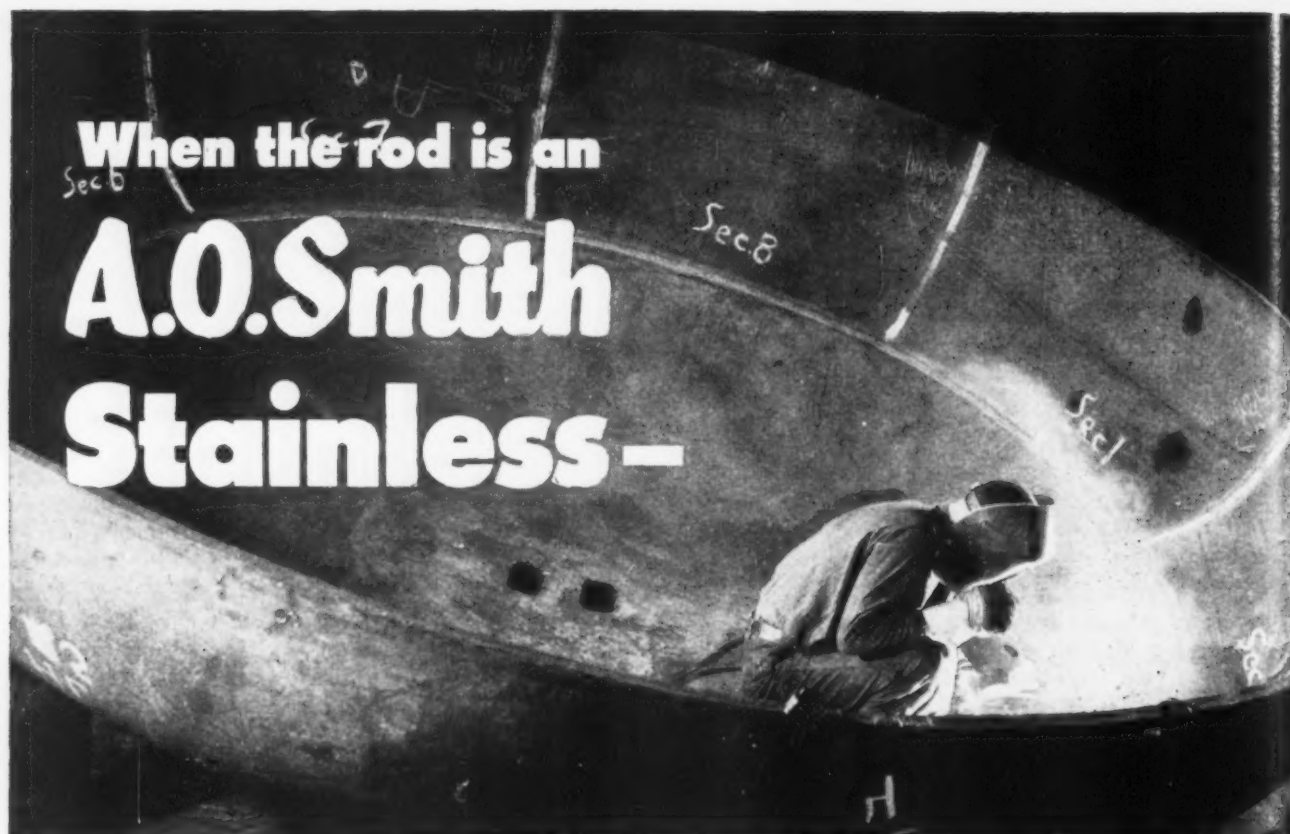
These incentives might be in the form of full tax write-offs on new facilities added during emergency periods.

Tax Revision—Perhaps the best method of enabling the industry to continue at a healthy operating rate would be reform of the present tax structure and depreciation laws. This would result in increased buying of new machine tools and create more up-to-date production equipment. It would be a much better way of preparing the country for a national emergency than storing of a multitude of end items subject to obsolescence.

These proposals, Mr. Howe said, have been made to the Advisory Committee on Production Equipment, known as the Vance Committee. The final report of the committee is not expected to be issued until some time next month.

Officers Elected—On the closing day of the meeting John M. Riordan, Riordan Machinery Co., Detroit, was elected president of the association. He succeeded E. J. Seifreat, Seifreat-Elstad Machinery Co., Dayton. E. R. Motch, Jr., Motch & Merryweather Machinery Co., Cleveland, was elected first vice president and Thomas R. Rudel, Rudel Machinery Co., New York, was made first vice president. The secretary-treasurer, G. B. McClennen of the Delta Equipment Co., Philadelphia was reelected to that office.





When the rod is an A.O. Smith Stainless—

-you know it's right

BECAUSE of A. O. Smith's matchless quality control

You, too, can eliminate field failure due to weld corrosion, with A. O. Smith stainless electrodes . . . your "insurance policy" that your specified requirements are met *exactly*.

"Tramp" steel cannot enter for manufacture because our quality control prevents it. No incoming coil of stainless core wire is ever acceptable for processing until exacting chemical, metallurgical and *spectrographic* analyses *prove* that it matches our specifications from end to end. This assures you of receiving the exact type and analysis of stainless to meet your job specification.

For your protection here are some of our controls: No more than one splice is permitted in any incoming coil. Why? So that, when we clip samples from each end of each coil for analysis, no part of any coil can escape the test. Then, when approved coils are straightened and cut,

the wire is immediately sealed in boxes to prevent mixing of lots.

As one of the largest users of stainless electrodes in building stainless vessels, A. O. Smith knows that these tests and precautions are necessary to assure top-quality production. No other electrode producer subjects stainless core wire to the exacting spectro-analysis, chemical and metallurgical tests as is done by A. O. Smith.

When you buy A. O. Smith stainless electrodes, you receive this matchless assurance of highest quality without paying any premium! A compelling reason for *insisting* on A. O. Smith stainless every time!

We'll welcome the opportunity to demonstrate A. O. Smith stainless electrodes on your job.

Write for free pocket-size electrode handbook.

A. O. Smith Certified Stainless Electrodes

ALL-POSITION

Electrode	AISI Type
SW-151	502
SW-152	505
SW-153	410
SW-154	430
SW-157	347
SW-158	317+Cb
	318
SW-159	310
SW-160	316
SW-161	317
SW-162	308
SW-166	309
SW-168	310+Mo
SW-169	310+Cb
SW-357	347
SW-359	310
SW-362	308

Available through A. O. Smith
Welding Products Distributors

Made by welders
. . . for welders

A.O. Smith

WELDING PRODUCTS

Milwaukee 1, Wisconsin

International Division: Milwaukee 1



See A. O. Smith advertising
in TIME and NEWSWEEK

Steel Prices Hit a Higher Level

Higher wage scales and soaring costs up steel prices from \$2.50 to \$4.50 per ton . . . Mills are booked into '53 . . . Some shortages, but supply expected to improve—By F. Sanderson.

New higher wage scales and soaring costs have moved Canadian steel prices upward. Boosts are on a sliding scale depending on the product concerned. But a few items were left unchanged including galvanized sheets, nails and some wire.

New price lists will show advances from \$2.50 to \$4.50 per ton, depending on type. Bars and plate were moved up \$3.50 per ton as was cold-rolled sheets, while hot-rolled sheets advanced \$2.50 per ton.

New Orders Heavy—Canadian steel mill representatives report heavy volume of new business. As a result of the outpouring of orders this fall, mills now are booked solid through the last quarter and some business has been placed for first quarter of 1953.

Shortages remain in some lines of steel and consumers are on a quota basis with regard to delivery. It is not expected there will be any improvement in tonnage allowable this year. Defense projects and production are taking more steel as new plants swing into operation and consequently draining off some consumer goods supply.

Easing Supply?—Prospects favor easing in supply early in the coming year when Canada's enlarged steelmaking capacity swings into operation. Also imports of steel from the United States are expected to run heavier in the future.

While government controls on steel are still in force, steel producers are largely handling deliveries under minor guidance from the Steel Control office. It is understood that most controls will be abandoned by the government by the end of the first quarter, 1953.

Nickel Contract—Defense Materials Procurement Agency (U. S.) contracted with two Canadian firms for purchase of up to 65,000 short tons of crushed nickel ore.

Production will come from the Sudbury district of Ontario. Under the contract, East Rim Nickel Mines, Ltd., will start mining at least 3500 tons monthly from its Sudbury holdings.

East Rim has no processing facilities. However, under a companion contract, Falconbridge Nickel Mines, Ltd., will put the ore through the first stages at Ontario. It will then be shipped to Kristianstad, Norway, for final processing.

Prices to be paid range from \$4.33 a ton for 1 pct nickel content up to \$15.39 a ton for 2.2 pct or more nickel content.

Holdings of East Rim are estimated to contain deposits of well over 2 million tons of nickel bearing ore.



Film Showing—The Steel Co. of Canada Ltd., last week gave a showing of its new film "Steel for Canadians" to an audience of several hundred industrial and business leaders at the Royal York Hotel. The movie presents a detailed story of steelmaking in the Hamilton works of Stelco from the first introduction of iron ore and other raw materials right through to the finished products.

Stelco's works is producing at a rate of more than 1,250,000 tons of steel a year, and when the present \$60 million expansion program is completed late this year, steel production at the Hamilton Works will jump 50 pct to more than 1.9 million tons a year.

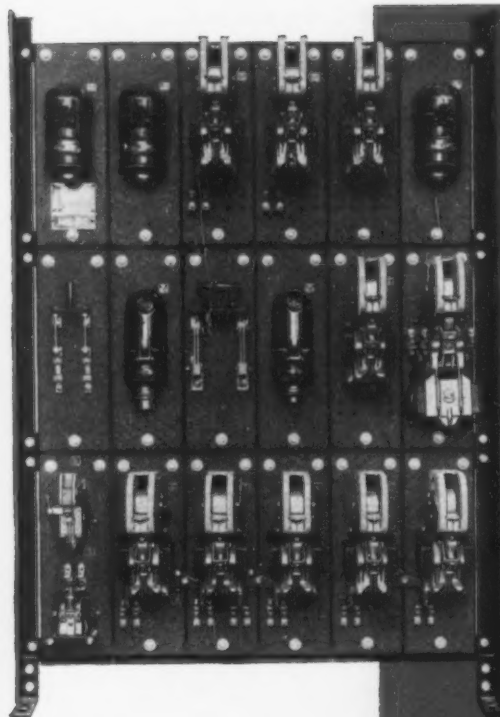
Stelco is said to manufacture a wider variety of steel products than any other company currently operating anywhere in the world. It produces more than 15,000 items in the steel lines.

This is to supply the needs of a varied market.

Scrap Supplies—Steel mill, foundry and scrap dealer representatives convened in Toronto last week to discuss ways and means of increasing iron and steel scrap supplies and iron out knotty problems regarding specifications and classification.

The talks had two main purposes—discussions of ways and means of maintaining an adequate flow of scrap for Canada's fast growing steel industry. Dealer-consumer discussions also focused on getting a modernized code of specifications for scrap grades.

The meeting indicated that present scrap supplies are thought to be adequate for current mill and foundry needs. New steel capacity is being built at a cost of some \$100 million. When this comes into production late this year or early 1953, increased demands could cause some shortages in the winter or spring months. Even if scrap supplies continue adequate, shortages may develop in some grades.



LOOK for these NAMES when buying Motor Control

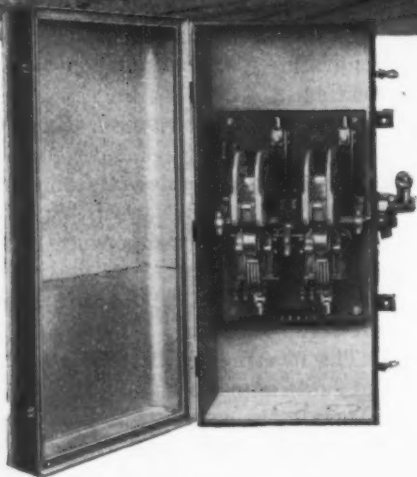
- 1 LINE-ARC Contactors
- 2 TIME-CURRENT Acceleration (D-c)
- 3 FREQUENCY RELAY Acceleration (A-c)
- 4 WRIGHT CIRCUIT Hoist Control (D-c)
- 5 YOUNGSTOWN Hoist Limit Stops
- 6 TYPE WB Brakes
- 7 CAM Master Switches
- 8 MANUAL-MAGNETIC Disconnect Switches
- 9 CONTRA-TORQUE Hoist Control (A-c)
- 10 TAB-WELD Resistors

These FUNCTIONAL NAMES Speak for Themselves

MANUAL-MAGNETIC Disconnect Switches for CRANES

*** PUSH UP to Close**
PULL DOWN to Open

Can be remotely operated from Cab
Push Button when handle is UP.



Alliance charging Machine with EC&M Manual-Magnetic Disconnect Switch.

Meets crane specification for disconnect-means on footwalk and in crane cab. Only one unit to install—push button permits disconnecting the crane in an emergency from the cab.

High interrupting capacity—reduces spare-part problem because designed with crane control parts—built to withstand crane service—no delicate parts to loosen under vibration.

Easy to operate—magnetic operation simplifies positive closure to "full-on" position—pulling handle down opens holding circuit; manual follow-up by roller actuated by operating-handle shaft forces contacts open if contactors fail to drop-out—also prevents accidental closure.

Has auxiliary contacts for controlling signal lights—provision for padlocking in off position—front-connected leads—ample wiring space.

For Safety and Convenience, specify EC&M **MANUAL-MAGNETIC Crane Disconnect Switches.**

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO



FREE publications

These publications describe money - saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Heat treating

Whether you need mammoth heat treating equipment requiring shipment by flat car or a midget unit you can hold in your hand, Pressed Steel Co. can fabricate the unit you want. Shown in a new brochure is some of the equipment PSC has made for specific applications. Since virtually all heat-treating equipment is custom-built, the catalog was put out primarily to show the versatility of the company's facilities. *Pressed Steel Co.*

For free copy circle No. 1 on postcard.

Building repairs

No matter what kind of wear, tear or other damage your plant has undergone, you'll probably find a repair product to fix it up described in a new booklet available from Stonhard Co. Just as an indication of the wide scope of maintenance problems that can be solved, Stonhard has a product to repair rutted floors, broken floors, leaky roofs, splintered roofs, rough floors, oily floors, acid conditions and spalled walls. The booklet is conveniently indexed to give the desired product needed to solve different maintenance problems. *Stonhard Co.*

For free copy circle No. 2 on postcard.

Melting pots

ACF melting pots have been designed expressly for use in aluminum foundries, diecasting plants, battery plants and smelting works. The pots have a gradually tapering thickness and sloping side-wall angles to resist swelling and distortion after the pot has been in use. A bulletin is available giving complete information on the pots. *American Car & Foundry Co.*

For free copy circle No. 3 on postcard.

Welding

For low cost production and maintenance welding, the A. O. Smith Challenger ac welder is the answer. Main feature of the unit is its wide welding range. For example, with the 400 amp model it is possible to weld 3/32-in. diam electrodes at 75 amp or go as high as 585 amp when using the largest diam electrodes. More data is contained in a new folder. *A. O. Smith Co.p.*

For free copy circle No. 4 on postcard.

Hydraulic cylinders

Dependability and ruggedness of Lindberg hydraulic cylinders have been proven in virtually every field of industry. Adaptable for a wide variety of uses, the cylinders are covered in a new 28-p. bulletin. Diagrams, photos and charts are included to explain the different mounting types available. *Lindberg Engineering Co.*

For free copy circle No. 5 on postcard.

Turn Page

use postcard below

Postcard valid for 8 weeks only. Information may be secured subsequently by separate letters fully describing each item wanted, including company name.

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77
Village Station
NEW YORK 14, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted.

10/9/52

Circle numbers for Free Publications or information on New Equipment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

If you want more details on other products advertised in this issue fill in below:

PAGE PRODUCT
PAGE PRODUCT
PAGE PRODUCT

YOUR NAME TITLE

COMPANY

CO. ADDRESS

CITY ZONE STATE

NATURE OF BUSINESS

Free Publications

Continued

Facing alloys

Detailed information on Colmonoy's line of hard-facing alloys designed to prevent wear is contained in a new folder. An extremely handy feature of the publication is the indexed guide to alloys for specific applications. *Wall Colmonoy Corp.*

For free copy circle No. 6 on postcard.

Sprocket wheels

It's sprocket wheels that make conveyers go 'round, and in a new catalog Link-Belt Co. lists more than 200 sizes of cast tooth sprocket wheels available from stock. There are wheels for 78 popular types and sizes of chains, including Ewart Link-Belt, Class 400 pintle, Class SS bushed roller, Class H pintle and Class C combination chain. In addition information is given on how to select sprocket wheels. *Link-Belt Co.*

For free copy circle No. 7 on postcard.

Synthetic rubber

Outlined in a new leaflet are Acadia Synthetic rubber products. Included are molded items, extruded shapes, sheet and roll goods, die cut parts and silicone rubber parts. In addition, the derivation of the 5 basic types of synthetic rubber is diagrammed to show the raw materials used to make the end product. *Acadia Synthetic Products Div., Western Felt Works.*

For free copy circle No. 8 on postcard.

Drills

Cincinnati Lathe & Tool Co.'s 14-in.-3000 Sliding Head Floor Drill is illustrated and described in a 4 p. specification sheet. This general purpose drill has six speeds. It is equipped with ball bearings and full-floating drive. *Cincinnati Lathe & Tool Co.*

For free copy circle No. 9 on postcard.

use postcard below

Postcard valid for 8 weeks only. Information may be secured subsequently by separate letters fully describing each item wanted, including company name.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted.

10/9/52

Circle numbers for Free Publications or information on New Equipment:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

If you want more details on other products advertised in this issue fill in below:

PAGE PRODUCT
PAGE PRODUCT
PAGE PRODUCT

YOUR NAME TITLE

COMPANY

CO. ADDRESS

CITY ZONE STATE

NATURE OF BUSINESS

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.R.R.)
New York, N. Y.

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77
Village Station
NEW YORK 14, N. Y.

Heads

Metal heads are frequently used as end closures for different types of pressure vessels, tanks and boilers. But they are also suitable for such uses as ladle and melting furnace bottoms, ends for annealing pots, gear and grinder guards, special wheels and other applications calling for an integral, continuous flange on a circular steel plate. In a new bulletin available from Joseph T. Ryerson is a listing of the company's ASME and Standard Types of flanged and dished heads available for immediate shipment from stock. In addition, there is general information on other uses for these units. *Joseph T. Ryerson & Son, Inc.*

For free copy circle No. 10 on postcard.

Rectifiers

Selenium rectifiers are heavy capacity units developed to change high voltage ac to dc. The rectifiers come with either manually operated or automatic circuit breakers. Specifications and complete details are listed in a new leaflet. *Syntron Co.*

For free copy circle No. 11 on postcard.

Arc welding

An interesting series of photographs and articles on welding is contained in Vol. IX, No. 1 of the *Hobart Arc Welding News*. Some of the topics discussed are discoloration and warping problems, arc welding as a substitute for riveting and the development of a welded elevator. *Hobart Bros. Co.*

For free copy circle No. 12 on postcard.

Electrical controls

Particularly practical for machine tools are the Square D reversing drum switches and fractional hp manual starters described in a new folder. The reversing drum switch is applicable wherever rotation direction of a small motor is to be controlled manually. The manual starter, which is available in a variety of enclosures, has also been designed for small motor use. *Square D Co.*

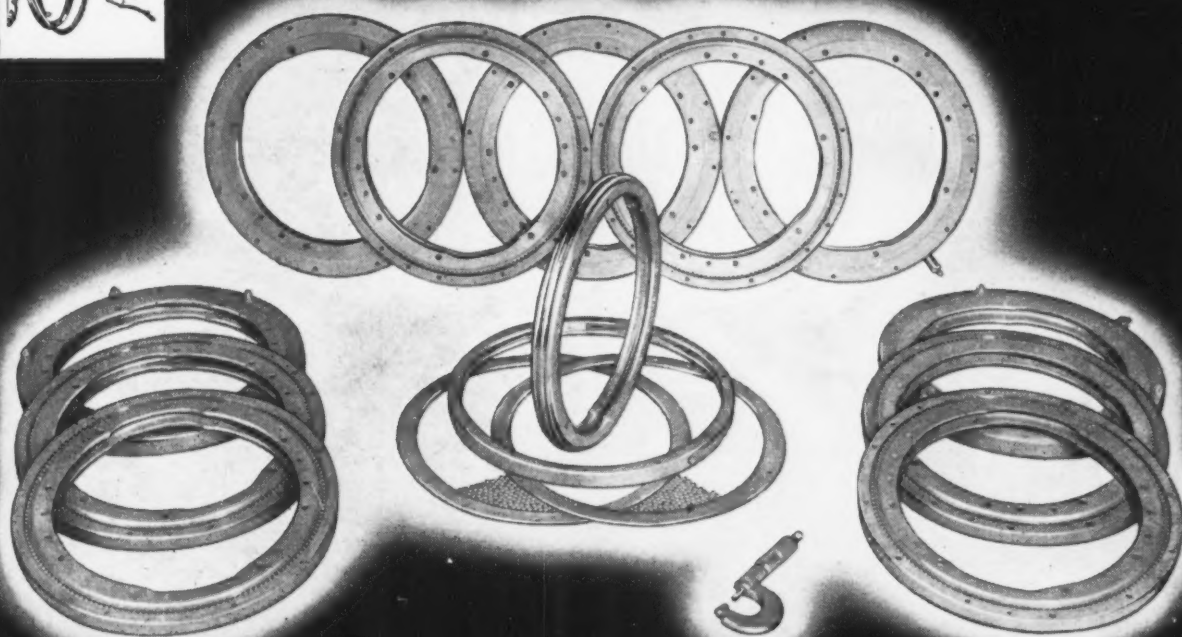
For free copy circle No. 13 on postcard.

Turn Page



Contact **KAYDON** of Muskegon

FOR ALL TYPES OF BALL AND ROLLER BEARINGS: 4" BORE TO 120" OUTSIDE DIAMETER



KAYDON two-row Special Ball Bearings
8.062" x 10.687" x .750"

Dependable Life-Savers ...KAYDON-bearinged *Piasecki* HELICOPTERS

CONTROL movements of Piasecki HUP Helicopters . . . life-savers of the air . . . are transmitted to the spinning rotor blade assemblies by means of a swash plate that moves on unique two-row KAYDON Special Ball Bearings.

Control of the helicopter is obtained by the movement of its rotor blades. Each blade can move in six different directions while they are rotating. Thus the mechanism responsible for control movements is complex, important, and it demands the utmost in bearing-precision.

KAYDON met the challenge of this intricate bearing-problem with these special two-row, thin section, 8.062" x 10.687" x .750" ball bearings. Similarly, KAYDON cooperates with designers of many types of precision equipment to achieve their objectives.



KAYDON two-row Special Ball Bearings
8.062" x 10.687" x .750"

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

PRECISION BALL AND ROLLER BEARINGS

KAYDON Types of Standard and Special Bearings:
Spherical Roller • Taper Roller • Ball Radial • Ball Thrust
• Roller Radial • Roller Thrust • Bi-Angular Bearings

AT YOUR SERVICE

2 NEW Shenango bulletins



... on
symmetrical
or annular
parts,
ferrous and non-ferrous

IF your plans call for bushings, liners, sleeves, rings, rolls, or any essentially symmetrical shape, find out about the many advantages you stand to gain with Shenango centrifugally cast parts.

BULLETIN NO. 150 covers non-ferrous parts in manganese and aluminum bronzes, red bronzes, brass, Monel Metal and special alloys.

BULLETIN NO. 151 covers parts

of Meehanite Metal, Ni-Resist and special iron alloys.

These new bulletins show typical Shenango produced parts that are saving time, trouble and cost in industries everywhere. Get the facts. Either or both bulletins are yours for the asking.

SHENANGO-PENN MOLD COMPANY

Centrifugal Castings Division
Dover, Ohio

Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL

Free Publications

Continued

Spray nozzles

For cleaning, cooling or descaling with water, Chain Belt Co. has a spray nozzle that will do the job efficiently. Rex Spray Nozzles, described in a new circular, provide a high velocity spray with a thin, flat line of impact to give sharp cutting action. To handle water pressures ranging from 20 psi to above 1000 psi, the nozzles come in different metals designed for specific pressure ranges. *Chain Belt Co.*

For free copy circle No. 11 on postcard, p. 225.

Cranes to plants

From a standard slewing crane to a fully equipped industrial plant, the German firm, Ardeltwerke G.m.b.H., promises a high quality product. Briefly sketched in a new folder is the company's startlingly extensive array of products. Included are cranes for numerous heavy duty applications, diesel shunting locomotives, induced draft blowers, equipment to fully outfit a pipe foundry. In addition, a complete iron plant is offered including original design, construction and installation of equipment. *Ardeltwerke G.m.b.H.*

For free copy circle No. 15 on postcard, p. 225.

Volt-Ammeter

Columbia Volt-Ammeter, recently introduced to the trade, is a clamp-type, hand-size instrument for use with alternating current. It measures up to 600 amp with four current ranges and up to 600 v with two voltage ranges. More information on this unit is available in a new mailing piece. *Columbia Electric Mfg. Co.*

For free copy circle No. 16 on postcard, p. 225.

Vises

Producto vises, outlined in a new leaflet, prevent accidental milling or drilling of vise parts. Included in the circular are technical details on the three models of the 6-in. vise available: Plain vise with ground sides, plain vise with clamping ears and swivel vise with graduated base. *Producto Machine Co.*

For free copy circle No. 17 on postcard, p. 225.



*this
is*

Lan-cer-amp

actual size
and color
LAN-CER-AMP #1

—the ingenious combination of rare earth metals which is now
conserving vital alloys and improving the physical proper-
ties of cast and wrought steel. Every day greater tonnage
of Lan-cer-amp treated steel is being produced. Write
or call. Let us discuss our latest developments with you.

American Metallurgical Products company

3600 Forbes Street • Pittsburgh 13, Pa.

BOLTS

Aircraft
Battery
Bicycle
Carriage
Connecting Rod
Cylinder Head
Dardelet
Elevator
Fitting-up & Boiler
Furniture
Hanger
Key
Lag
License Plate
Machine
Plier
Plow-cultivator
Ribbed
Sheathing
Skein
Spring Center
Step
Stove



Stud
Tire
Track
"U," "J," Eye & Hook
Weather Tight
Wheel

NUTS

Acorn
Aircraft
Castellated
Cold-forged
Cold punched
Hot pressed
Lamson Lock Nuts
Machine Screw
(square & hex)
Marsden
Semi-finished
Weld

**PINS**

Cotter
(steel, stainless, brass)
Clevis

**SCREWS**

Cap
Clutch Head



Lag
Lock Washer
Machine
Phillips Head
Spin lock
Tapping
Thumb

SPECIALTIES

Bent Products
Capped Bolts
Flat Spring Keys
Hinge Pins
Inserts, plastic
Lok-thred Studs
Pipe Plugs
Place Bolts
Plug Nuts
Rods
Sems
Spin Lock Screws
Studs—milled
Screw machine
products
Tinnern Rivets
Washers
Wire Rope Clips
Wheel Wrenches

Many of these products are available in Carbon and Alloy Steel,
Brass, Bronze, Stainless Steel, Monel Metal and Aluminum Alloys.
Finishes: Pentrate Black • Cadmium • Chromium
• Electro-galvanized • Dichromate and Parkerized

this is what we mean by
"the COMPLETE LAMSON LINE"

The home of "quality controlled" fasteners

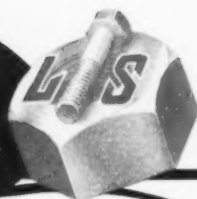


The LAMSON & SESSIONS Co.

1971 West 85th St. • Cleveland 2, Ohio

Plants at Cleveland and Kent, Ohio • Birmingham • Chicago

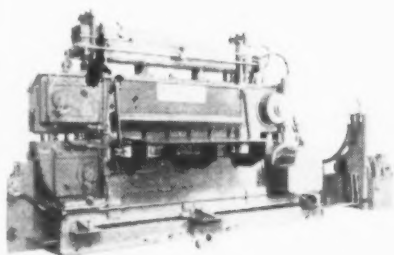
**Lamson
&
Sessions**



**CLIP THIS PAGE FOR YOUR
PERMANENT REFERENCE**

NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 225 or 226.

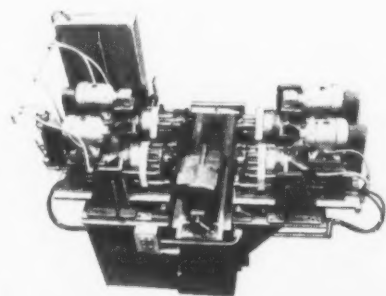


Flash trimmer used in rolling mill line

This new rolling mill flash trimmer is designed for use in a continuous process rolling or pickling line. It is placed in the line adjacent to the flash welder which joins coils of steel to form a continuous strip for processing. The welded sheet is moved to the approximate center of the trimmer which is provided

with hydraulic horizontal traverse 6-in. each way from center for final alignment of the machine with the weld. Materials 0.056 to 0.250 in. thick can be trimmed. Thinner and thicker materials can be trimmed with special cutters and clamping dies. *Morton Mfg. Co.*

For more data circle No. 18 on postcard, p. 225.

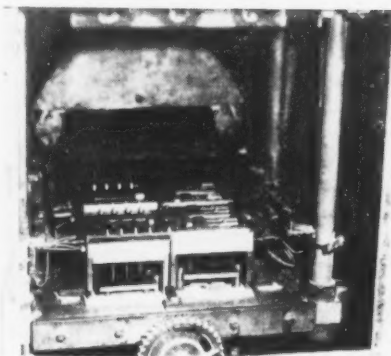


Automatic machine drills transmission cases

A special two-station drilling and tapping machine drills and taps six power take-off holes on each side of seven different transmission cases. The machine is designed with angular, side and vertical adjustments to accommodate the differences in the relative positions of the holes. The machine's four

hydraulic feeding units and four gearless drill heads are standard equipment. The hole patterns in the heads, and adjustments for drilling angles, requires special engineering. The machine is completely lubricated from a central system. *Zagar Tool, Inc.*

For more data circle No. 19 on postcard, p. 225.

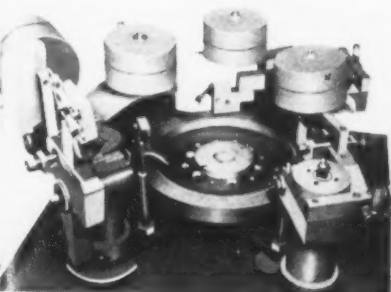


Shell molding equipment available to foundries

New shell molding equipment makes it possible for foundries to take advantage of the production possibilities of the shell molding process without heavy expenditures for experimental and development work or equipment. A completely automatic machine turns out approximately 20 complete shells from a single set of dies every hour. Simple and dependable in opera-

tion, this machine performs all steps of the shell molding operation, delivering finished shells ready for pouring or storage. The machine accommodates dies up to 12 x 18 in. This Bachner die-molding machine is installed at an initial cost and rented by the foundry on a use basis. *Powdered Metal Products Corp. of America.*

For more data circle No. 20 on postcard, p. 225.



Carbide surface grinder reduces diamond cost

For production of solid carbide blanks, a multiple head surface grinder produces a finish of 1 to 2.5 rms and gage block flatness, using a 150 grit diamond wheel. It holds dimensions to ± 0.0002 in. The process used permits a wheel to be dressed and trued to 0.0005

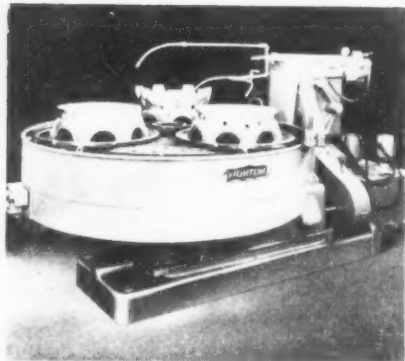
in a few minutes. Longer wheel life is assured, reducing diamond cost from 20 to 50 pct per unit. Diamond salvage is less than 1 carat per lb of sludge. No skilled labor is required. *Spike Mfg. Co.*

For more data circle No. 21 on postcard, p. 225.

Turn Page

New Equipment

Continued

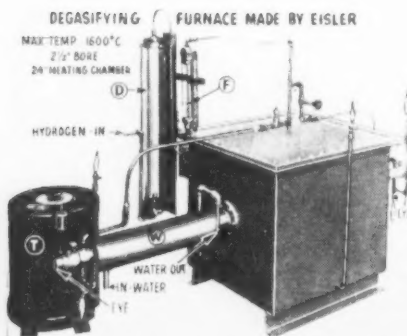


Flat lapping machine has 60-in. single face

Equipped with a 60-in. diam segmental bonded abrasive lap, a new flat lapping machine provides a superior means for lapping large parts. On soft metal parts it produces in a minimum of time a clean, finished surface free from grit either embedded or trapped in pores or crevices. Advantage of producing a clean surface on soft metal parts makes it possible to

lap these to provide seal surfaces, wear surfaces, or surfaces to be subsequently drilled or milled, without an immediate cleansing of the parts after lapping. The bonded abrasive produces bright surfaces that require no subsequent polishing operation. Accuracy is maintained throughout the life of the lap by a simple diamond truing operation. *Norton Co.*

For more data circle No. 22 on postcard, p. 225.



Degasifying furnace for small metal parts

An improved degasifying furnace for radio tube and metallurgical industry can be used for small metal parts which have to be surface cleaned and degasified for further processing. The furnace is a complete unit with the fast drying tower and flow control gage mounted on the furnace top. The temperature regulating trans-

former can be placed anywhere for convenience. Heating chamber is 24 in. long x 1 to 12-in. ID. Loading can be intermittent or continuous. Maximum temperature for safe operation is about 2900°F. Gases in use for the furnace are hydrogen, nitrogen, a mixture of both. *Eisler Engineering Co., Inc.*

For more data circle No. 23 on postcard, p. 225.

Reclaim

VITAL SCRAP

MILWAUKEE

CASTINGS ARE PERMANENT

402-52

New Equipment

Continued

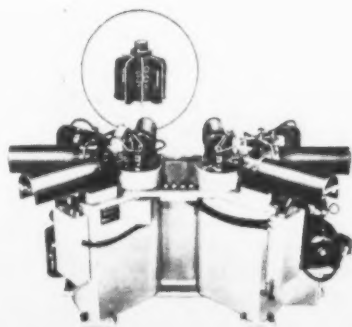


Unit suited for production line testing

Combining high temperature, low temperature and humidity, a new test chamber for production line and experimental testing has a temperature range from +250°F to -100°F. Accelerated pull-down is one of the features offered in the unit which can be cycled from ambient to -100°F in 45 min and can be cycled from -100° to +200°F in 30 min. Both high and

low temperatures are governed by a temperature controller. Humidity is regulated by a wet and dry bulb controller which provides 95 per cent relative humidity at temperatures between 75° and 95°F. Vacuum equipment can be added to simulate high altitude conditions. *Industrial Freezer Div. Webber Appliance Co., Inc.*

For more data circle No. 24 on postcard, p. 225.



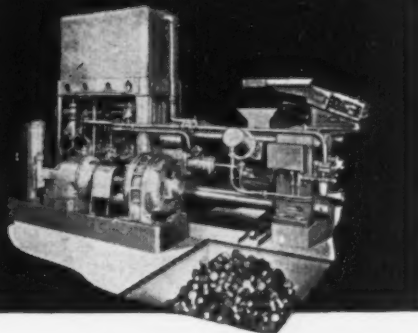
In-line drilling units speed fin production

Eight traversing motor shaft type drilling units designed into a special machine speed production of 6 mm mortar shell fins. The equipment is completely automatic. The two station unit employs only one operator for feeding and unloading both stations at the end of each cycle. The machine drills sixteen 2/16-in. holes in each fin, drill-

ing the four upper holes, indexing 180° and drilling the remaining four upper holes. The workholding spindle raises and the operations are automatically repeated for the 8 lower holes. Absolute accuracy is said to be maintained and output has been speeded up to 300 to 400 fins per hr. *Black Drill Co.*

For more data circle No. 25 on postcard, p. 225.

with a MILWAUKEE BRIQUETTING PRESS



Convert low-grade bulk borings, turnings, chips and shavings into compact high-grade briquettes with the press that pays for itself! The MILWAUKEE Briquetting Press effects substantial savings by conserving vital metals, providing close scrap control, and reducing scrap handling and storage costs.

Automatic in operation, the MILWAUKEE Press handles steel, aluminum, cast iron,

bronze, magnesium, brass and other metals at rates up to 3½ tons per hour. Briquettes produced can be charged directly into furnace or foundry cupolas. In most plants, savings pay for press in less than one year. Write today for 8-page illustrated Bulletin No. 117 for complete data on six models available.



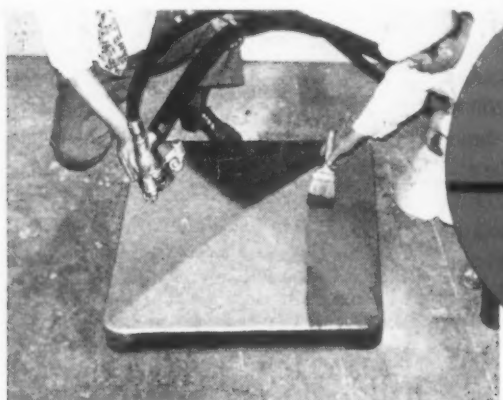
Foundry Equipment Division

6461 GRAND DIVISION AVENUE • CLEVELAND 25, OHIO

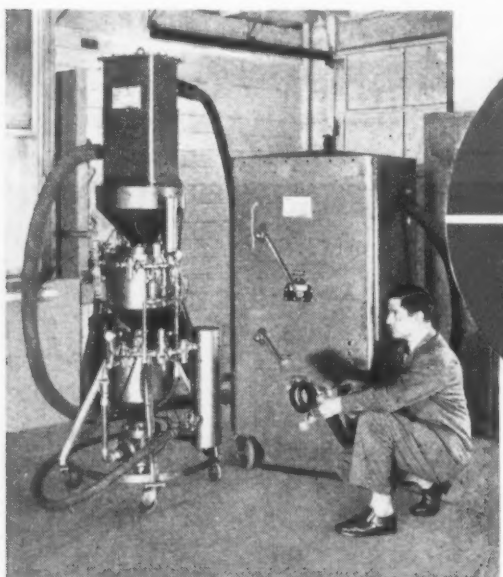
BLAST CLEANING

WITHOUT DUST

VACU-BLAST scours the surface, eats the dust and reclaims the abrasive — all at once!

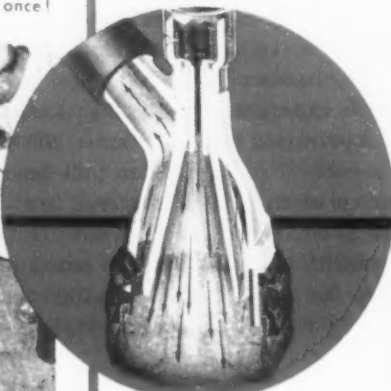


Right in the midst of your working shop, Vacu-Blast removes rust, paint and scale from metal, masonry and wood with a thoroughness and efficiency that only abrasive blasting provides. Surfaces are perfectly prepared for welding, painting or process requirements, yet there's no dust or scattered abrasive to interfere with other operations.

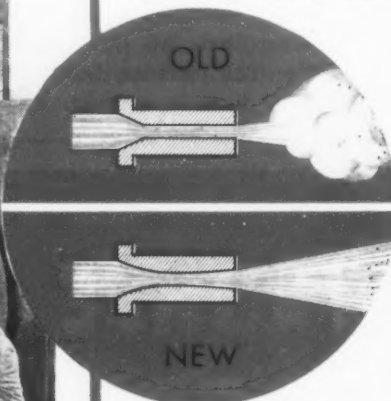


This is Vacu-Blast's working team — the blast gun — the combination generator/reclaimer, and the dust collector. All are compact, portable and easy to move around.

OR GRIT



The abrasive, dust and debris are confined within the blast gun — they are picked up by Vacu-Blast's unique, patented vacuum return. The blasted surface is left clean and dustless. Your shop is protected from the nuisance of scattered dust and grit. Valuable abrasive is reused numerous times.



Newest Vacu-Blast improvement is the flared, high efficiency nozzle that does up to 25% more work per hour than previous nozzles. Developed through extensive research, the throat design of this new nozzle eliminates inefficient shock waves, resulting in full power flow of abrasive. This new nozzle is now provided on all Vacu-Blast equipment, and has been made available to all present users.

VACU-BLAST CO. INC.

268 PENINSULAR AVENUE, SAN MATEO, CALIF.

Please send specific detail information applying to the

business.

Firm

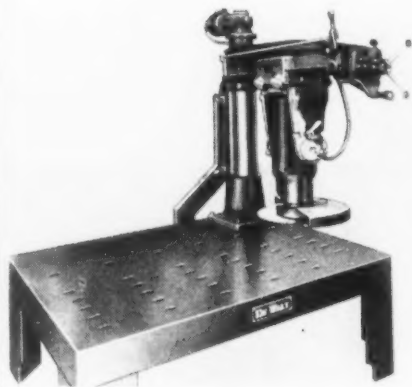
Address

Signed

Write for
free booklet

New Equipment

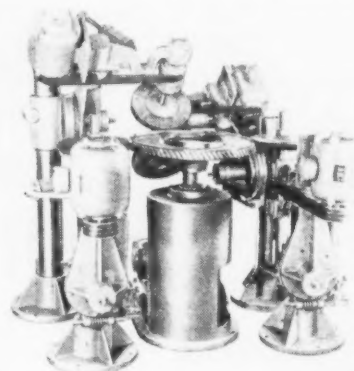
Continued



Foundry machine

A new foundry machine, Model ME-2F, is used for cutting the gates and risers from large castings. It is so constructed that the cutting can be done with the radial arm positioned above the work table. For castings which are too large to be placed on the table, the arm can swing behind the table, and the gates and risers can be removed with the casting resting on the floor. DeWalt Inc.

For more data circle No. 26 on postcard, p. 225.



Head for jet program

A new polishing head has been developed for the fast, accurate and economical deburring of turbine disk-slots. It incorporates several Murray-Way universal-positioning features. The head may be used with either wheels or buffs and is compact for use in groupings practical with a minimum of floor area. In the turbine disk-slot operation, two, three or four heads are used as the work requires. Heads may be dropped or added easily if found necessary. Murray-Way Co.

For more data circle No. 27 on postcard, p. 225.

Turn Page

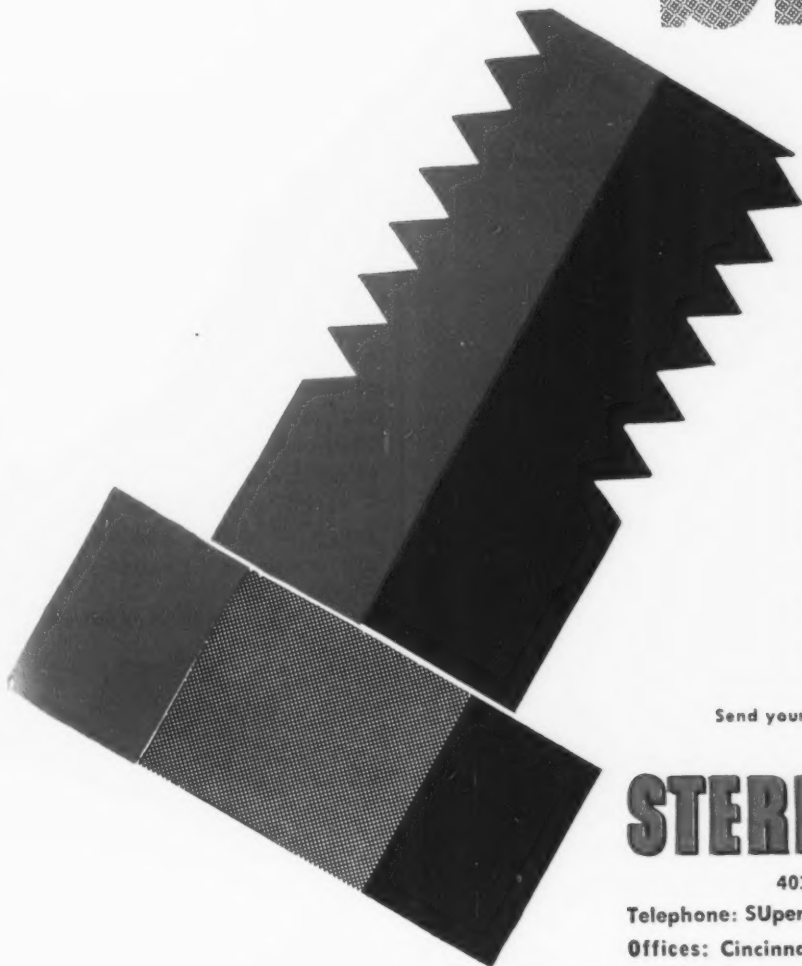
Here at Sterling Bolt Co., a single, integrated **DEPENDABLE** source can supply you with more than **200,000** stock and standard sizes in Bolts, Nuts, Screws and Washers for your specific needs.

For more than 35 years Sterling Bolt has been a prime supplier of metal fastenings to America's best-known companies—because Sterling facilities combine both warehouse and mill, giving you advantages of **PROMPT SERVICE** and **COMPETITIVE DISCOUNTS**.



try these for

SIZE



THE INDUSTRIES WE SERVE— AND SERVE WELL!

Refrigeration • Pumps • Cranes • Elevators
• Tractors • Trailers • Conveyors
• Mining Equipment • Blower & Fan
Equipment • Diesel Engines • Bodies—
Motor Truck & Trailer • Electrical
Manufacturing • Air Conditioning
• Material Handling Equipment
• Machinery Manufacturing • Radio &
Television • and many others—

Interested in Cutting Costs?

No need to count on expensive, time-consuming specials when Sterling Bolt Standardized Bolts, Nuts and Screws can fit your job—200,000 to one!

Send your inquiry or order **TODAY**—to the

STERLING BOLT CO.

403 West Erie Street, Chicago 10, Ill.

Telephone: **SUPERIOR 7-3000** • Teletype: **CG 488**

Offices: Cincinnati, Indianapolis, Milwaukee, St. Louis

RBC's



PITCHLIGN

TRADE MARK

ROLLER
BEARINGS

PITCH CIRCLE ALIGNMENT for PEAK EFFICIENCY



Wasted energy!



... worse



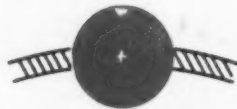
Efficiency plus!



... not above



... not below



At the pitch line!



• Aligned at the *pitch circle*, the most efficient plane for roller guidance, PITCHLIGN rollers are not subject to the internal stresses incurred in other bearings where the cage acts at a point above or below the pitch circle. In PITCHLIGN bearings, tangential forces are virtually eliminated, since the cage acts only in the direction of rotation and at a point coincident with the roller orbit.

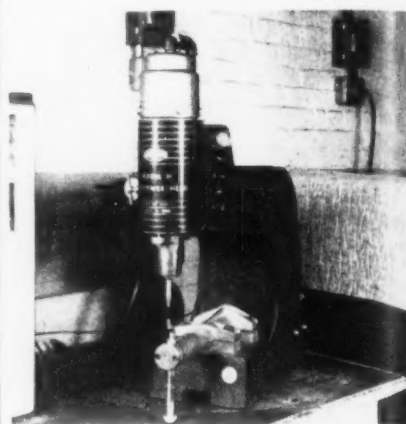
PITCHLIGN'S performance potential far exceeds that of precision needle-type bearings. Rollers cannot cock or skew! PITCHLIGN is interchangeable with precision needle bearings, of course. Get the facts! Write for Bulletin 37-306.

RBC

ROLLER BEARING COMPANY OF AMERICA • TRENTON, N. J.

New Equipment

Continued



Fastening metals

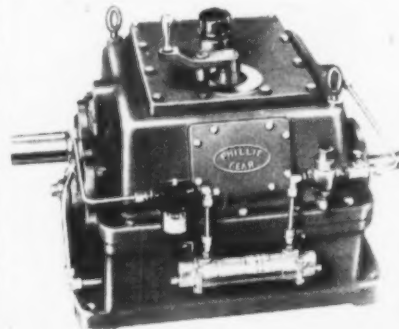
New Weldpower units that make use of the principle of stored energy join metals on a production basis, including ferrous, nonferrous and dissimilar metals. Energy is stored in the interval between welds, and discharged at the electrode tips in a pulse of high voltage and exceedingly short duration. This makes it possible to fasten metals of different melting points quickly, economically, without burning or oxidation at the point of the weld. *Raytheon Mfg. Co.*

For more data circle No. 28 on postcard, p. 225.

Change speed units

Standardized change speed units are positive, reliable geared drives, using herringbone gears throughout. They provide definite ratios of speed reduction, speed increasing, or a combination of both. There are no belts to wear out and cause speed variations. Two, 3 and 4 speed combinations, in a wide range of ratios and horsepowers are available. *Philadelphia Gear Works, Inc.*

For more data circle No. 29 on postcard, p. 225.



Turn Page

Now! Make your own from the free air!

99.9% PURE
OXYGEN

99.99% PURE

NITROGEN

... made simultaneously
with **ONE GENERATOR**

Low cost inert gas—high-purity nitrogen in large quantities—and low cost high-purity oxygen—can now be made in the same generator. If you use oxygen—and use inert gases for annealing, steel making, heat treating, chemical manufacturing, etc., write us your requirements, and send for our NEW CATALOG. *Air Products, Incorporated, Dept. I, Box 538, Allentown, Pa.*

To see an Air Products Generator in operation, visit Booth 1662 at the Metal Show

Air Products

**OXYGEN — NITROGEN — ARGON
GENERATORS**



Specialists in Equipment for All Low-Temperature Processes

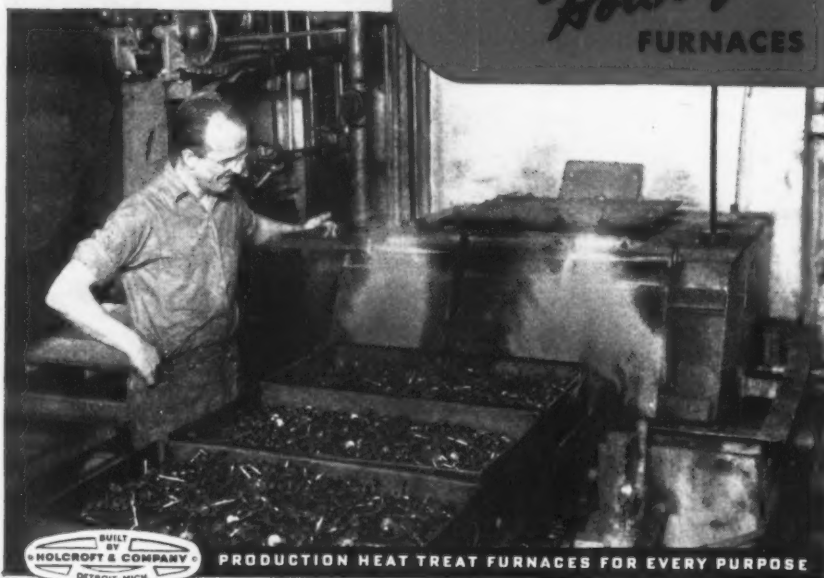


for
**CARBO-NITRIDING
PARTS LIKE THESE**

Leaders like to do business with leaders. They depend upon them to fulfill obligations and to accomplish the intangibles of research and development.

That's why so many industrial pacemakers do business with Holcroft. They know that they will be protected by the integrity of a company which has been "blazing the heat treat trail" for better than 35 years. They know, too, that their new heat treat furnaces will possess all of the latest features . . . permitting them to operate at a lower cost and at a higher efficiency. Holcroft was the first to apply carbo-nitriding to high production furnaces. Continuous-type furnaces like the one shown do a better job—at a much lower cost. Write today. **Holcroft and Company, 6545 Epworth Boulevard, Detroit 10, Michigan.**

INDUSTRY LEADERS
USE **Holcroft**
FURNACES



BUILT
BY
HOLCROFT & COMPANY
DETROIT, MICH.

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO 9
C. H. Martin, A. A. Engelhardt
4206 South Western Blvd.

CLEVELAND 15
Wallace F. Schott
1900 Euclid Ave.

HOUSTON 1
R. E. McArdle
5724 Navigation Blvd.

CANADA
Walker Metal Products, Ltd.
Windsor, Ontario

EUROPE
S. O. F. I. M.
Paris 8, France

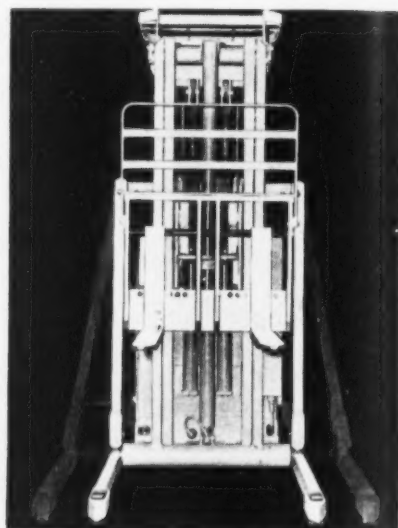
New Equipment

Continued

Adjustable base forks

Adjustable base forks for handling pallets of various widths are optional equipment for a line of straddle-type electric tiering trucks. The forks permit Raymond trucks to handle pallets varying from 32 to 48 in. wide. Made of rugged welded steel sections, the forks are hinged to the main frame and adjusted manually by a screw arrangement. *Raymond Corp.*

For more data circle No. 30 on postcard, p. 225.

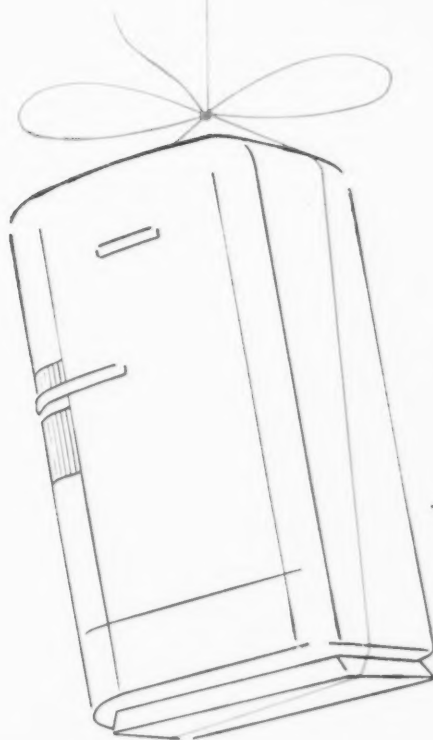


Gaging system

A new versatile micro-step gaging system is an integrated and related series of gaging items that make it easy to use gage blocks directly in everyday gaging operations. Nucleus of the system is a series of gage block holders and end standards which are used to construct innumerable gaging and layout set-ups up to 72 in. long in steps of 0.000025 in. A time-saving, pre-calibrated dial indicator is used for constructing precise indicating type gages. Other components of the system include 5 and 10 in. sine plates and a book that lists directly the gage blocks to be used in forming 10,000 different dimensions and which instantly gives the correction to be made when checking non-steel parts with gage blocks, at temperatures above or below 68°F. *DoAll Co.*

For more data circle No. 31 on postcard, p. 25.

Turn to Page 244



When reputation hangs "by a thread"



*the source of your
threaded fasteners
becomes
vastly important*

It's unlikely that any customer will ever know or care where you get the screws, bolts and nuts that hold your product together. But if just one of those threaded fasteners fails to hold properly and causes the customer serious inconvenience, your product gets the blame. To that extent, your hard-won reputation literally hangs "by a thread."

When you look to Pheoll for your every need in screws, bolts, nuts and special threaded fasteners, you've gone all the way toward making sure of *uniform, high quality*. Pheoll's half-century of experience, constant research and rigid product inspection assure this. And with Pheoll Quality, you now get these PLUS services!

First, new, efficient procedures for production scheduling and order control that add up to "delivery promises that count." *Second*, truly modern facilities so extensive they'll easily meet your toughest schedule demands or volume requirements. *Third*, cost saving design and engineering assistance to simplify your fastener problems. *Fourth*, experts in special products, and producers of the most complete standard product line in the screw industry. *Fifth*, continuously large inventories of both finished goods and raw materials assure prompt deliveries of your requirements.

The full facts are so remarkable they've been put into a booklet titled, "Pioneering in Customer Service." May we send it to you?

PHEOLL



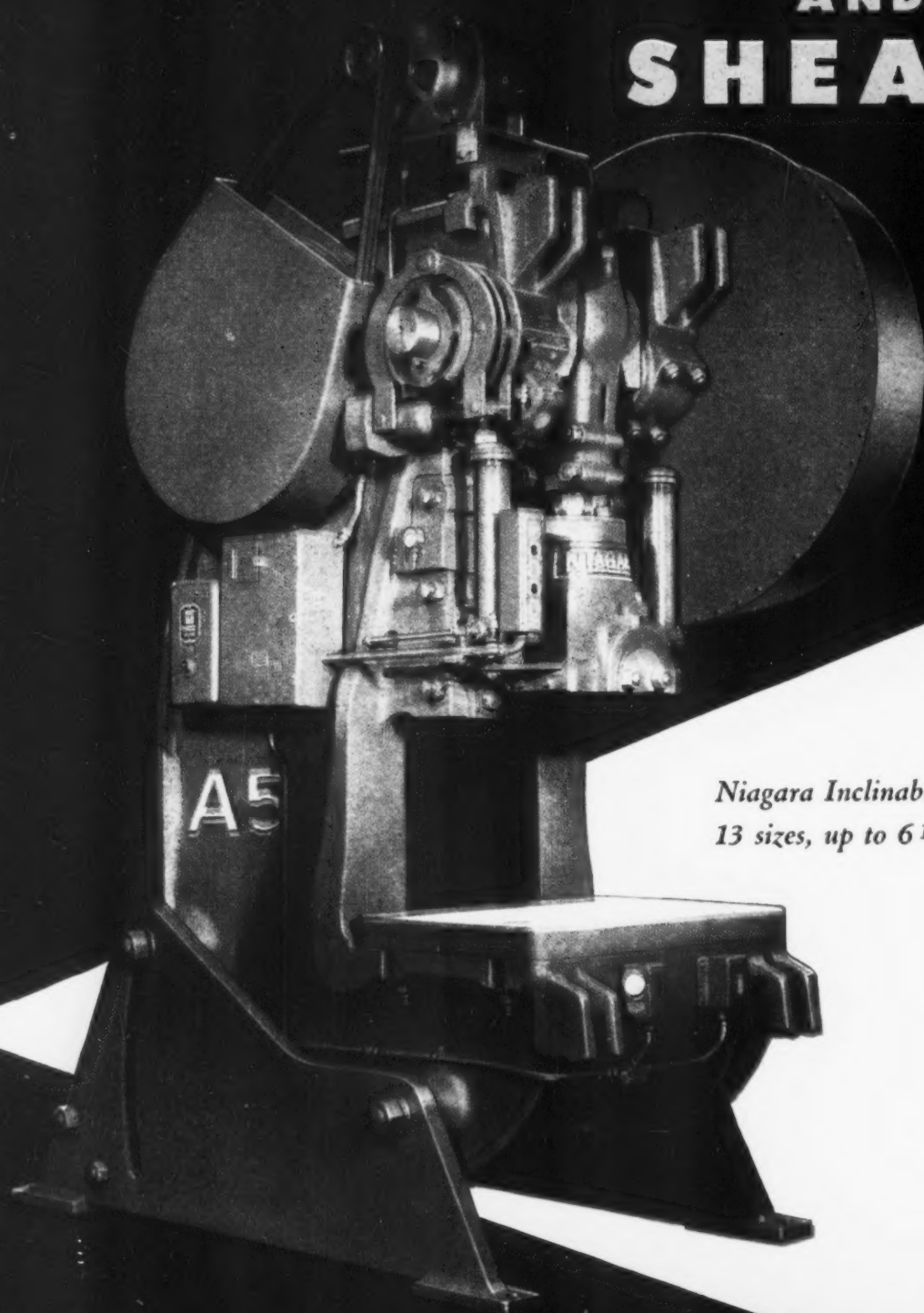
SCREWS
BOLTS
NUTS

MANUFACTURING COMPANY

5700 ROOSEVELT ROAD, CHICAGO 50, ILL.

NIAGARA

PRESSES AND SHEARS



*Niagara Inclinable Presses.
13 sizes, up to 6 1/2 inch shafts.*

NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, NEW YORK

for Defense Production

- The sound engineering and long practical experience, incorporated in the design and construction of Niagara Presses and Shears, pay dividends in increased production and low maintenance cost...two essentials in the defense program.

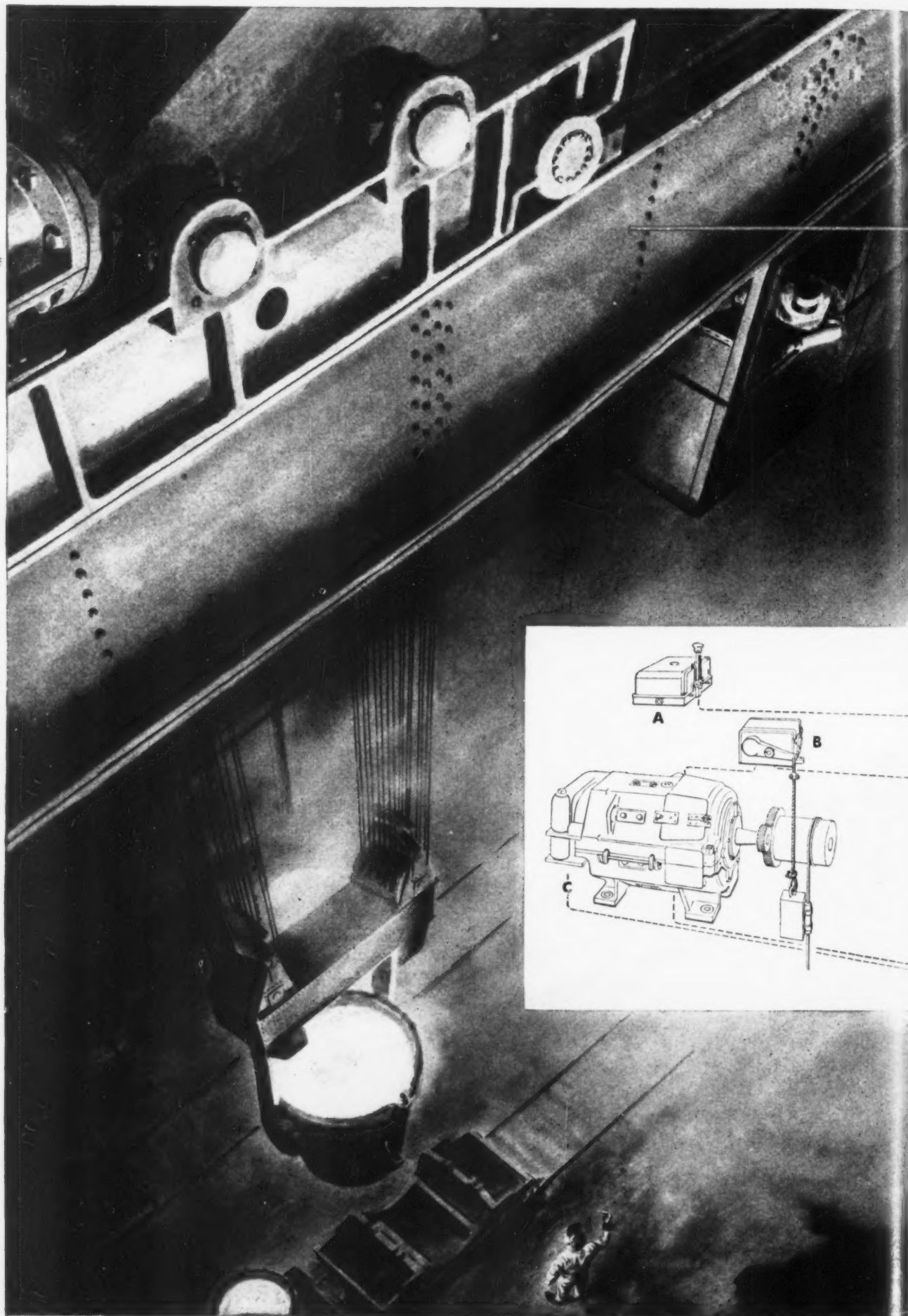
Write for Bulletins



Manufacturers of a Complete Line of Sheet Metal Working Equipment Ranging from Small Hand Tools up to Large Power Operated Machinery.

Niagara Power Squaring Shears. Capacity from shim stock up to 1 inch thick steel. Lengths 3 feet to 20 feet.

DISTRICT OFFICES: DETROIT, CLEVELAND, NEW YORK



MILL RATED muscle for heavy hoisting

Steel mill crane hoist control must have the stamina to take ceaseless beatings. It must be built of components that are mill rated . . . that keep functioning regardless of exposure to dust, dirt, heat, cold and round-the-clock hard service.

The Westinghouse D-C Constant Voltage Crane Hoist Control meets these requirements. It is built to stand up to the daily abuse found in most steel mill operations. Heavy-duty, mill-type electrical equipment is used throughout. The Type M contactors and series-wound, 600-series, d-c motor

are mill rated. Dependable operation is further assured by the basic simplicity of the control system.

OPERATING CHARACTERISTICS ARE COMPLETE AND FLEXIBLE

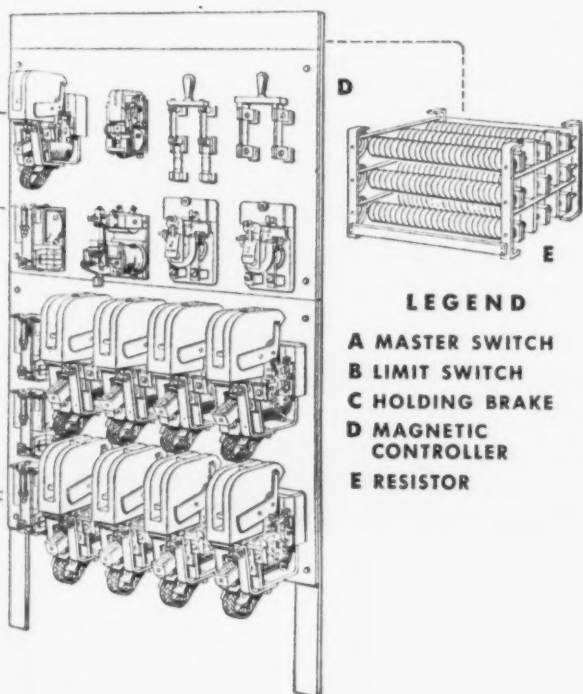
Loads Slip Into Place due to proper proportioning of speed increments between master switch points and selection of correct resistor connections.

Slow-Speed Hoisting Is Available with empty hook. In lowering, suitable kickoff torque is obtained with careful resistor design enabling the motor to reach steady-state speed quickly without overshoot.

High Lowering Speeds Are Available when required. The high-speed lowering point has an independent adjustment to facilitate closer control at these high speeds.

Standard Control Panel contains only nine contactors and four timing relays in addition to protective equipment. All are front mounted for easy accessibility. All are standard units.

New Heavy-Duty Contactors and a combined control system and resistor design, that prevent excessive current peaks during transitions or while plugging, prolong equipment life.



Get this Descriptive Booklet B-5420

Full descriptive information on all components of the Westinghouse D-C Constant Voltage Crane Hoist Control is contained in this free booklet. Your Westinghouse representative has a copy for you. Or, you can get a copy by writing direct to: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-27017

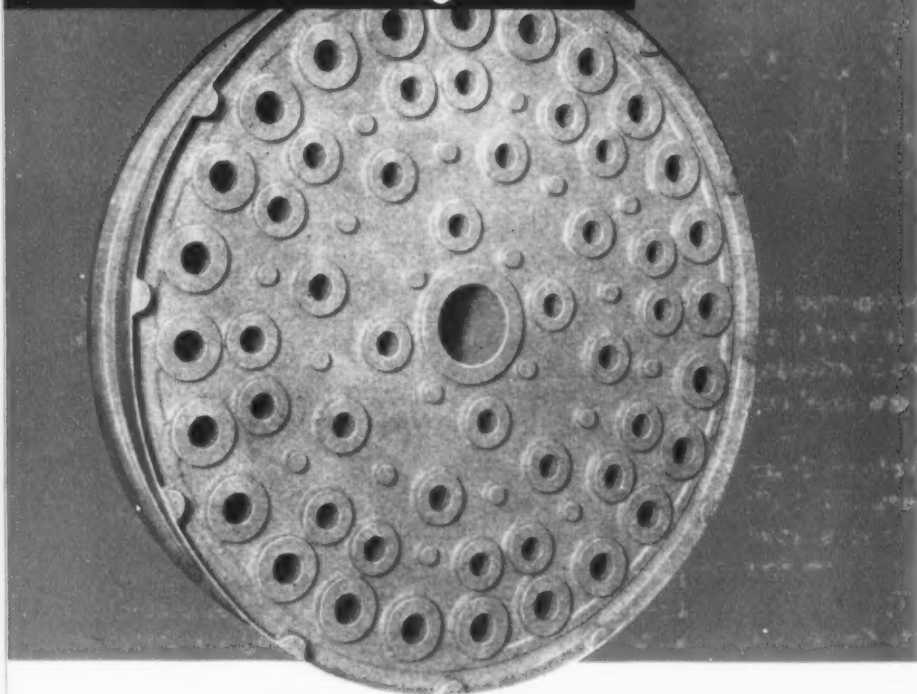


YOU CAN BE SURE...IF IT'S
Westinghouse

CRANE CONTROLS



use castings?



WELDMENTS CAN SAVE YOU MONEY!

Acme weldments are replacing castings for leading machinery and equipment manufacturers everywhere because they do a better job at lower cost. Experienced Acme engineers at work with Acme's complete fabrication facilities can give you these same advantages . . . Acme's new 24-page, illustrated booklet shows you why. *The Facts about Weldments and Castings* tells you what you should know about their relative strength, rigidity, vibration, design flexibility, and cost . . . facts to help you specify and save. And it's yours for the asking . . .

ACME

TANK and WELDING

DIVISION of THE UNITED TOOL & DIE CO.

078 New Britain Ave. • West Hartford 10, Conn.

A.S.M.E. Qualified Welders • National Board Approved
Hartford Steam Boiler Inspection Service • A.P.I. Approved
Underwriters Label and Inspection Service • Navy Approved



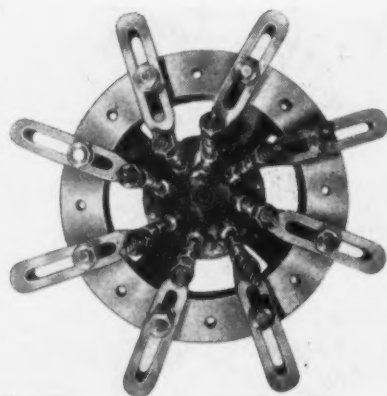
Write for yours TODAY!



GREATER STRENGTH • INCREASED RIGIDITY • IMPROVED DESIGN • LOWER COST

New Equipment

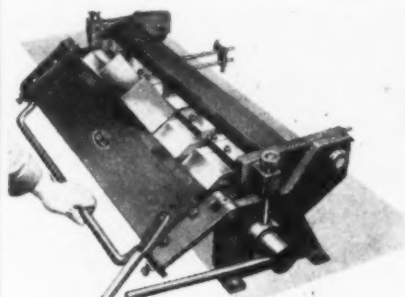
Continued



Joint drilling head

Universal joint drilling head is adjustable to any pattern of holes and is available with 4 to 12 spindles. The head features all aluminum housing construction, thrust bearings and gears turned on spindles. Available in two sizes: No. 0, 0 to 1/4 in., full range of collets furnished; No. 1, 3/16 to 1/2 in., No. 1 Morse Taper socket or chucks for straight shank drills. *Errington Mechanical Laboratories, Inc.*

For more data circle No. 32 on postcard, p. 225.



Bending brake

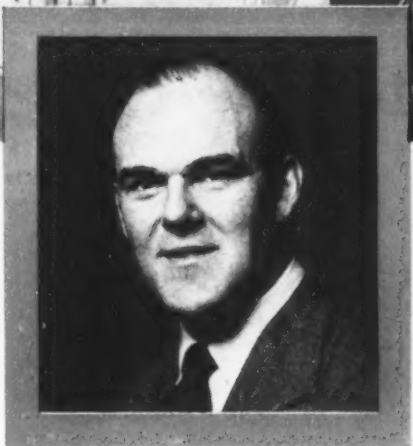
A hand-operated, universal, box and pan brake is designed to be mounted on a work bench for greatest convenience and operating ease. With a capacity for any bending operation on sheet metal up to 18 gage and 24 in. long, it is suited for model and experimental shops. Bending edge is made up of fingers in graduated widths fitted to a bar. Fingers are easily adjusted or removed as the work requires. They can be used in any combination anywhere along the bending edge for folding, box and pan work, and straight bending operations. *Dress & Krump Mfg. Co.*

For more data circle No. 33 on postcard, p. 225.

Turn Page

THE IRON AGE

"LET UDYDLITE SAY
WHATEVER THEY WANT
ABOUT OUR INSTALLATION
—IT HAS LIVED UP
TO ALL CLAIMS."



LEW WENGERT

**Says Lew Wengert, Plant Superintendent
of Utica Drop Forge & Tool Corporation**

That was the reply we got when we asked Mr. Wengert, superintendent of the Yorkville plant of the Utica Drop Forge & Tool Corporation, about the Udydlite Rotary Full Automatic in that plant. The machine is used for processing jet engine parts.

Mr. Wengert's enthusiasm is typical of Udydlite customers. He has found, like many other users, that Udydlite lives up to the claims made by our salesmen. The Udydlite organization owes its progress and growth to the guiding principle of being honest with its customers. So, if you're in the market for equipment and supplies for a "better way in plating", it will pay you to look to Udydlite. Call in your Udydlite Technical Man today and let him tell you the complete story. Or write to The Udydlite Corporation, Detroit 11, Michigan. *There's no obligation.*



PIONEER OF A BETTER WAY IN PLATING

You can count on KEMP to solve any protective atmosphere problem



**Delivers exact
same analysis
inert gas
regardless
of demand**

DAY AFTER DAY Kemp users throughout the metals field report: Kemp Atmosphere Gas Generators maintain exact analysis of chemically clean atmosphere gas regardless of demand . . . eliminate the possibility of mixture fluctuations at some critical phase of processing. These same users report big gas and maintenance savings with Kemp. Also Kemp Generators are fast-starting, easy-to-operate . . . offer real savings in both time and money by reducing the costly warm-up period necessary for starting. You

can't go wrong when you specify Kemp Atmosphere Gas Generators.

Set it . . . forget it!

The Kemp Industrial Carburetor, standard equipment and the very heart of every Kemp installation, assures you complete combustion . . . without tinkering . . . without waste. Uses ordinary gas right from mains. Every Kemp Design includes complete up-to-the-minute fire checks and safety devices. Why not find out how Kemp can help you with your problems, today?

KEMP
OF BALTIMORE



GAS GENERATORS

Write for Bulletin 1-10 for technical information

THE C. M. KEMP MFG. CO.

405 E. Oliver Street, Baltimore 2, Md.

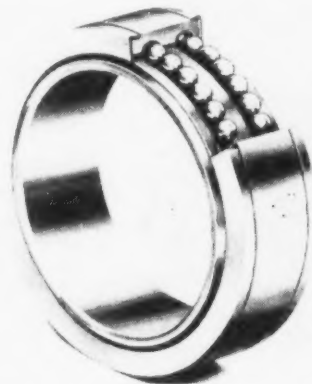
CARBURETORS • BURNERS • FIRE CHECKS • ATMOSPHERE & PURITY GAS GENERATORS
ADSORPTIVE DRYERS • METAL MELTING UNITS • SMOGGING EQUIPMENT • SPECIAL EQUIPMENT

New Equipment

Continued

Ball bearing bushing

A new ball bearing bushing type DR-L for applications where space is limited features a split outer race which permits introduction of a full complement of balls. A section height of 0.250 is said to open



a new field for anti-friction performance. Prelubricated at the factory, these bearings give extended service without need for regreasing. Outer race is ground to close tolerance for press fit. Bore is available in two types adapted to press or slip fitting. Both types will carry thrust and radial load. *Split Ballbearing Corp.* For more data circle No. 34 on postcard, p. 225.

Cutting attachment

New cutting attachment that cuts steel and other metals up to 8 in. thick fits on the Linde W-202 and W-201 welding blowpipes in place of the usual welding heads. It is intended for intermittent cutting on general, run-of-shop jobs. Twenty-three oxyacetylene cutting nozzles are available for all types of cutting. *Linde Air Products Co.* For more data circle No. 35 on postcard, p. 225.

Dual-purpose container

Rubber hose is being shipped in a double-duty corrugated container. In addition to being a basic shipping container which protects the hose, the unit functions as a dispenser. Hose can be uncurled and pulled out through an opening in the center of the lid. A measuring rule printed on the sides and holes of the container shows how much unused hose is left. *Gaylord Container Corp.*

For more data circle No. 36 on postcard, p. 225.

HERE ARE SOME APPLICATIONS
WHERE SANDVIK STEELS
ARE STAR PERFORMERS

To find out more
about SANDVIK
Specialty Steels...

See
SANDVIK
AT BOOTH #402
National Metal
Exposition

Philadelphia Oct. 20-24th

Featuring

COLD ROLLED, HARDENED,
TEMPERED AND BLUE POLISHED
SPRING STEEL APPROXIMATELY 1/5
THE THICKNESS OF NEWSPRINT!

One of the things you'll see
spotlighted at Sandvik's booth is
Sandvik's Super-Precision... strip
steel, cold rolled to .0006"
(6/10,000ths of an inch)!

Sandvik cold rolled strip steel is available:

- Precision-rolled to fit your application
- In straight carbon and alloy grades
- In special analyses for specific applications
- In more than 800 stock sizes
- Annealed, unannealed or hardened and tempered
- Polished bright, yellow or blue

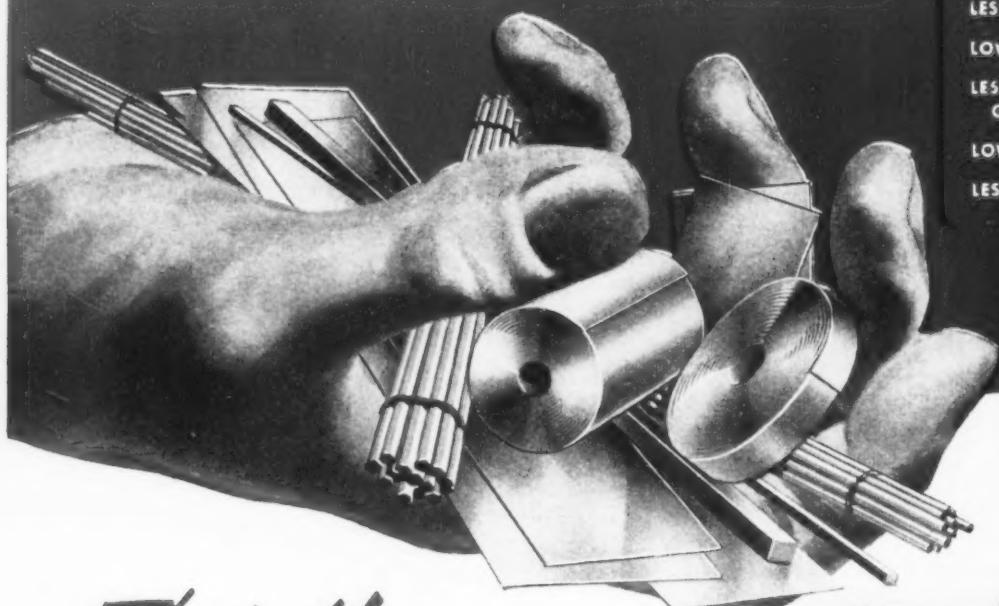
SANDVIK STEEL, INC.

111 EIGHTH AVE., N. Y. 11, N. Y. WAtkins 9-7100
330 N. Michigan Ave., Chicago 1, Ill. FRanklin 2-3625
1736 Columbus Rd., Cleveland 15, Ohio, CHerry 1-2383
SANDVIK CANADIAN LTD., P. O. Box 40, Station Q, Montreal 5, P. Q.
SANDSTEEL SPRING DIVISION • New York • Industrial Springs
SANDVIK SAW & TOOL DIVISION • New York • Saws and Tools



SS-84

CHECK THESE SAVINGS



LOWER INVENTORY
INVESTMENT
LESS SPACE NEEDED
LOWER HANDLING COST
LESS DAMAGE AND
OBsolescence
LOWER ACCOUNTING COSTS
LESS INSURANCE NEEDED

They're Yours...

when you place your
Steel and Aluminum
inventory problems in our hands

When you put your warehousing problems in our hands you save in many ways. For instance you select from a COMPLETE stock of steel and aluminum . . . daily delivery eliminates tying up your dollars in idle inventory . . . no inventory loss due to design changes requiring different sizes and gauges . . . smaller space requirements mean more space for production . . . accounting, insurance and handling costs are cut.

Korhumel Steel and Aluminum specialists and metallurgists can help you with your problems of steel and aluminum application. What's more you have at your disposal complete facilities for precision slitting, shearing and cutting to length.

A Korhumel Sales Engineer in your territory will be glad to work with you. Check your classified telephone directory . . . call him today or write for full particulars on Korhumel "Personalized Warehouse Service."



Korhumel *Steel and Aluminum Co.*

2426 OAKTON STREET, EVANSTON, ILLINOIS

Chicago Phone: AMBassador 2-6700
Evanston Phone: DAVis 8-3000

Warehouses and Sales Offices in Cincinnati • Des Moines • Detroit • Grand Rapids • Indianapolis • Los Angeles • Milwaukee • Minneapolis • New York • Rockford • St. Louis

STEEL

Cold and Hot Rolled
Strip and Sheet
Spring Steel, Tempered
and Annealed
Feeler Gauge
Round Edge Flat Wire
Shim Steel
Electro Galvanized
Electrical Sheets
Tin Plate
Cold Finished Bars
Steel Tubing, Seamless
and Welded
Rigidtex Stainless

ALUMINUM

Strip and Sheet
Coils
Straight Lengths
Bars

PHOSPHOR BRONZE

Coils and Flats

SERVICES

Slitting
Shearing
Edge Rolling
Bright Annealing
Cold Rolling
Ungerer Roller Leveling

The **Iron Age**

SALUTES

Dr. John Chipman

One of the world's most outstanding metallurgists, his career has been marked by achievement and acclaim.



FORTUNATELY, the evaluation of Dr. John Chipman's career as a metallurgist will not be left to historians. His contemporaries have already acknowledged his genius.

Called by many "the father of modern metallurgical thermodynamics," he has been singled out for an astonishing number of honors during his brilliant 32-year career. Next week he steps down as president of the American Society for Metals, but another honor replaces the one he relinquishes when the ASM awards him one of its highest marks of respect, the Albert Sauveur Achievement Award, offered in recognition of his contributions to metallurgical knowledge.

American scientists and engineers are not alone in appreciating Dr. Chipman's talents, however. Less than 3 weeks ago, the Italian Metallurgical Society awards him one of its highest marks of respect, the Albert Sauveur Achievement research.

It is no surprise, therefore, to find that 55-year-old Dr. Chipman has been head of the Dept. of Metallurgy at Massachusetts Institute of Technology for the last 6 years. He is exceptionally well-equipped for this responsible position. For in addition to his vast teaching experience at many of the top engineering schools in the country, he has done research work in industry and has directed phases of atom bomb studies for the Army.

Perhaps as a carryover from his early days as a chemistry professor, Dr. Chipman has also achieved a more temporal fame among the MIT faculty for his tasty mint juleps. An outdoor man, he spends many of his leisure hours landscaping the grounds around his home at Winchester, Mass.

for springs that keep their spring

WICKWIRE GAMMA SPRING

WIRE



Upholstery springs made from Wickwire Gamma Spring Wire can be counted on for long-lasting retention of resiliency.

Wickwire Gamma Spring Wire is always uniform in quality and tensile strength because it is a product of fully integrated facilities...which means complete control of materials, manufacture and testing from ore to finished wire.

Whatever your needs in specialty steel wires... high or low carbon steel...round or shaped...in all tempers, grades and finishes—For the Wire You Require, Check With Wickwire.

THE COLORADO FUEL AND IRON CORPORATION—Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION—Oakland, California
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo
Chicago • Detroit • New York • Philadelphia

WICKWIRE WIRE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION



The Iron Age

INTRODUCES

Howard T. Brinton, elected president, Phelps Dodge Copper Products Corp., fabricating subsidiary of PHELPS DODGE CORP., Elizabeth, N. J.; W. J. Palmer, named vice-president in charge of manufacturing; and John J. Conlon, made general superintendent.

Frank A. Whittall, appointed president, CONTINENTAL CAN CO OF CANADA, Montreal. He will succeed Harry A. Rapelye, who has retired.

D. E. Moody, appointed president, Canefco, Ltd., a subsidiary of ELECTRIC FURNACE CO., Salem, Ohio; K. U. Wirtz, named vice-president; and H. E. Farintosh, made secretary-treasurer.

Carl J. Snyder, Robert W. Conder, and James Cope, all appointed vice-presidents, CHRYSLER CORP., Detroit.

Stephen T. Orr, made a vice-president of the president's staff, WYANDOTTE CHEMICALS CORP., Wyandotte, Mich.; and Frank Wolcott, becomes general manager of manufacturing, Michigan Alkali Div.

John Hellstrom, vice-president, AMERICAN AIR FILTER CO., Louisville, Ky., appointed director of sales.

Charles E. Mertler, appointed vice-president in charge of engineering and development, STEVENS MFG. CO., INC., Mansfield, Ohio.

J. T. Butler, named chief tool engineer, TEMCO AIRCRAFT CORP., Dallas.

J. Thad Watters, made works manager of bauxite operations, ALCOA MINING CO., Bauxite, Kansas. He succeeds Luther R. Branting, who has retired after 32 yrs with the company.

Lewis C. Ely, appointed industrial sales engineer, Southeastern states, THE PARKER APPLIANCE CO.

Felix W. Saco, appointed mechanical development engineer, THE PERMUTIT CO., New York.

Eric Ledin, appointed group engineer for cockpit design, ENGINEERING & RESEARCH CORP., Flightronic Flight Simulator Div., Riverdale, Maryland.

Sam R. Read, named staff engineer, VISI-TROL ENGINEERING CO., Detroit.

J. J. Barker, appointed head, Process Dept., WALTER KIDDE NUCLEAR LABORATORIES, New York.

Martin A. Edwards, named manager of engineering, X-Ray Dept., GENERAL ELECTRIC CO., Schenectady; and Thomas F. Garahan, appointed manager of manufacturing personnel services section.

R. Kenneth Plumb, appointed manager, slag sales, U. S. STEEL CO., Pittsburgh; and Edgar B. Speer, named division superintendent of steel production, Gary Works.

Denton Massey, named general manager of European operations, WILLYS-OVERLAND EXPORT CORP., Toledo.

Richard H. Gannon, named manager of sales office, Los Angeles district, KAISER ALUMINUM & CHEMICAL SALES, INC.

Otto Janssen, appointed manager, spare parts sales, AIRESEARCH MFG. CO., Los Angeles.

James K. Hoyt, appointed assistant western manager, A. MILNER & CO.; and William P. Cooney, named sales representative, Philadelphia district.



G. H. TEICHERT, appointed president and a member of the board of directors, Alloy Steels, Inc.



HERBERT J. WATT, named assistant vice-president-sales, western area, U. S. Steel Co., Pittsburgh.



F. ROYAL GAMMON, appointed assistant vice-president-sales, eastern area, U. S. Steel Co., Pittsburgh.

Personnel

Continued

Gordon M. Williams, appointed assistant supervisor, agricultural chemicals research section, **PITTSBURGH COKE & CHEMICAL CO.**, Pittsburgh.

C. B. Foster, appointed to newly created position of sales manager-engines, **CUMMINS ENGINE CO., INC.**, Columbus.

Thomas F. MacLaren, appointed representative, Los Angeles office, **BROWN & SHARPE MFG. CO.**, Providence; and **Frank K. Wilkey**, named representative in Los Angeles.

Raymond Dearth, becomes sales engineer, Northern Indiana area, **THE UDYLLITE CORP.**

Irving R. Taylor, appointed assistant manager, Warren Machine & Die Div., **THE AMERICAN WELDING & MFG. CO.**, Warren, Ohio.

N. C. Hays, made west central district manager, **DAVEY COMPRESSOR CO.**, Kent, Ohio.

Peter R. Prunkl, appointed plant manager, **TUBE REDUCING CORP.**, Wallington, N. J.

P. F. Marsaw, named personnel manager, **REED ROLLED THREAD DIE CO.**, Worcester, Mass.

Ray C. Wright, promoted to sales manager, **STRONGHOLD PACIFIC CORP.**, Los Angeles.

Leland E. Coulter, named general manager, R-B interchangeable punch and die activities, Hillsdale, Mich., plant, **ALLIED PRODUCTS CORP.**

William M. Taylor, named manager, Export Dept., Quaker Rubber Corp., a division of **H. K. PORTER CO., INC.**, Philadelphia.



F. C. MESSAROS, named vice-president in charge of engineering, American Engineering Co., Philadelphia.



CHARLES T. ZAORAL, becomes vice-president in charge of operations, New York Air Brake Co.



H. PAGELS, appointed vice-president in charge of manufacturing, American Engineering Co., Philadelphia.



LEWIS K. SILLOX, elected vice-chairman of the board, New York Air Brake Co.

SEND FOR

WILMOT CONVEYOR BULLETIN 502



As Originators of Rivetless Chain, Wilmot Offers Widest Choice of Chain Sizes and Conveyor Attachments

The booklet contains engineering data on rivetless chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs.; of drop-forged steel, alloy or cast chrome-manganese steels. Wilmot not only stocks the largest choice of chain sizes, but also furnishes the widest range of other con-

veyor parts: sprockets, traction wheels, flights, take-ups, shafting, bearings and trough in cast iron, ductile iron, carbon or chrome-manganese steel to fit the application. See why an increasing number of leading firms are cutting "down" time by depending on Wilmot for all conveyor replacement parts.

WILMOT ENGINEERING CO.

HAZLETON, PA.
Foundry and Shops:
WHITE HAVEN, PA.



WAREHOUSE STOCK

Why they think of **WARD** when it's **SPRING STEEL**

Why do so many concerns refer to **WARD** as "THE HOUSE OF SPRING STEEL?"

Over the years, satisfied users throughout the United States and Canada knew they could obtain the proper grade of **SPRING STEEL** for the intended application.

Adequate stocks are always available, with two thousand (2,000) sizes of both **TEMPERED** and **UNTEMPERED** grades, which give the customer an **UNLIMITED SELECTION**.

If **WARD** is not your **TOP SOURCE** for **SPRING STEEL**, then we respectfully solicit your consideration with the confidence, once you patronize **WARD**, you will be among the countless steady users of this highly specialized product.

Our general catalog will be furnished upon request.

WARD STEEL COMPANY

87A Rindge Avenue Extension • Cambridge 40, Mass.

UNiversity 4-2460

Branches

7 Fenner St., Providence, R. I., GAspee 1-5573, 1-8573
3042-3058 West 51st Street, Chicago, Illinois, GROVEHILL 6-2600

Sales Agent: **CHARLES H. STAMM**
10 North Main Street • West Hartford 7, Conn.
Hartford 32-4448



Weighty shipping problem solved by Brainard Strapping Service

SPEEDING up the handling and shipping of this heavy limestone posed a problem. Here's Brainard salesman Dick Decker of Indianapolis showing his customer the answer . . . palletizing the load and securing it with Brainard heavy-duty steel strapping.

Steel strapping is the most economical way to unitize loads . . . to simplify handling, and insure safe shipment. But proper application is all-important. That's why Brainard service consists of "know-how" and "show-how".

Men like Dick Decker are qualified to study your packaging and handling operations, then recommend

and demonstrate the most efficient system for you.

For complete steel strapping service, call your Brainard salesman. Offices located throughout the U. S. In Canada: P. J. McArthur Company, Toronto.



COMPLETE STEEL STRAPPING SERVICE, LIGHT AND HEAVY DUTY STRAPPING, TOOLS AND ACCESSORIES

For illustrated catalog write Brainard Steel Division, Sharon Steel Corporation, Dept. 0-10, Griswold Street, Warren, Ohio.



WARREN, OHIO

Personnel

Continued

R. H. Filsinger, Jr., appointed district manager, Pittsburgh area, VANADIUM CORP. OF AMERICA. He succeeds **John B. Girdler**, appointed sales manager.

Henry W. Becker, named assistant director of industrial relations, specializing in labor relations, REPUBLIC STEEL CORP., Cleveland.

J. T. Maidens, appointed manager, Philadelphia territory, MORSE TWIST DRILL & MACHINE CO. He will be assisted by **William Rogers**.

Jerry G. Wilson, named engine sales supervisor, Sales Development Div., CATERPILLAR TRACTOR CO., Peoria, Ill.

Clifton P. Brown, appointed assistant manager, Fastener Div., in Nashua, New Hampshire, EDGCOMB STEEL OF NEW ENGLAND, INC.

J. D. Bryan, Jr., appointed sales promotion manager, PEDEN IRON & STEEL CO., Houston, Texas.

Ernest R. Johnson, appointed district manager, Central Alloy district, REPUBLIC STEEL CORP., Cleveland, Ohio.

John Longden, named district manager, Salt Lake City office, NATIONAL ELECTRIC PRODUCTS CORP.

Harry T. Brunstetter, appointed superintendent, Silicon Strip Dept., REPUBLIC STEEL CORP., Warren District steel plant; **William E. Schnitgen** becomes assistant superintendent of the Dept.; and **P. R. Cleary**, promoted to lubrication engineer.

A. N. Mason, appointed sales representative and **John K. Gillett**, also appointed sales representative, Metropolitan New York, and northern New Jersey, MICHIGAN OVEN CO.

OBITUARIES

D. F. Hahn, 52, vice-president, production manager, and a director of General Box Co., suddenly.

Clarence Earl Bleicher, 62, president and general manager of De Soto Div., Chrysler Corp., at Henry Ford Hospital in Detroit.

Frederick L. Curtis, 84, retired vice-president of Raybestos-Manhattan, Inc., and former general manager of Manhattan Rubber Div., at his home.

IF YOU HAVE FLUID LINES TO CONNECT

YOU'LL SAVE TIME AND TROUBLE WITH

HANSEN

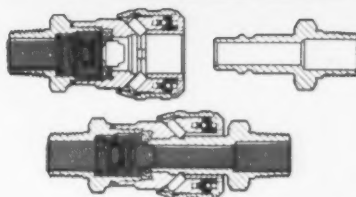
QUICK • CONNECTIVE COUPLINGS



HANSEN PUSH-TITE COUPLING

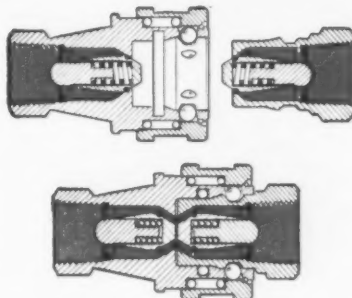
Shuts off one side of line

Gives quick connection and disconnection, with instant automatic flow or shut-off. To connect coupling, and open line to flow of fluid, merely push plug into socket. To disconnect, a slight pull on sleeve releases plug and shuts off supply end of line.



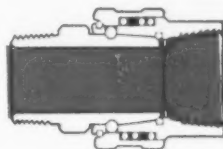
HANSEN HIGH PRESSURE TWO-WAY SHUT-OFF COUPLING

To connect, pull back sleeve and push plug into socket. Identical torpedo type valves permit free flow of gas or liquid through coupling. To disconnect, pull back sleeve..coupling immediately disconnects, valves automatically seal both ends of line. Can be mounted to disconnect automatically where fluid lines may be subject to sudden, damaging strain.



HANSEN STRAIGHT-THROUGH COUPLING

Provides quick connection and disconnection, but does not have shut-off feature. Size range for general use from 1/4" to 2 1/2". Two special types of straight-through couplings also available—one for low pressures, and one for high pressures.

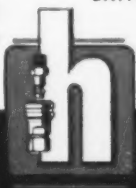


QUICK-CONNECTIVE FLUID LINE COUPLINGS

for

AIR • OIL • WATER • STEAM • VACUUM
OXYGEN • ACETYLENE • GASOLINE
GREASE • COOLANTS • REFRIGERANTS
HYDRAULIC FLUIDS

Since 1915



REPRESENTATIVES

BALTIMORE
BIRMINGHAM
CHICAGO
CLEVELAND
DALLAS
DAYTON

DENVER
DETROIT
FT. WAYNE
HARTFORD
LOS ANGELES

LOUISVILLE
MILWAUKEE
MINNEAPOLIS
NEW ORLEANS
PITTSBURGH

ROCHESTER
SAN FRANCISCO
SAVANNAH
SEATTLE
ST. LOUIS

MONTREAL

TORONTO

VANCOUVER

Export Department: CLEVELAND

Write for catalog giving complete range of types
and sizes of Hansen Quick-Connective Couplings

THE HANSEN

MANUFACTURING COMPANY

4031 WEST 150th STREET

CLEVELAND 11, OHIO

selecting

the exact steel



is almost

this easy!

The age of push-button steelmaking has not yet arrived. But many a steel buyer has learned that a buzz to his secretary is the first step in making contact with a team of steel experts who can put their special knowledge and skills to work making the *right* steel to do the job. We have this team at Inland.



INLAND STEEL COMPANY

38 South Dearborn • Chicago 3, Illinois

SALES OFFICES: Chicago • Milwaukee • St. Paul • Davenport
Kansas City • St. Louis • Indianapolis • Detroit • New York

Record Attendance Predicted for Metalworking's Biggest Show



FROM Oct. 20 to 24 Philadelphia will play host to what sponsors and exhibitors expect will be the biggest Metal Show ever. Technical sessions will be held in downtown hotels; the exhibits will be housed under a single roof on 210,000 sq ft of space in Convention Hall. To ease the strain on tired feet, the aisles of the exhibit halls will be covered with some 1.5 miles of carpet with a foam rubber backing.

This year's show will put more emphasis on "hard selling," more exhibits, more practical demonstrations. For effort, attendance and worthwhile ideas, no metalworking meeting tops this exposition and its technical sessions. Somewhere among the hundreds of technical papers, seminars and symposiums there will be valuable ideas for the metalworking executive. And among the 400 exhibits he is bound to see new ideas and new products to help him cut costs—or at least hold them in line.

The Congress (technical papers, etc.), begins on Saturday, Oct. 18 and continues through Friday, Oct. 24. For details see the technical program which starts on the following page.

The Exposition will be held in Convention Hall (34th St. & Curie Ave., about a mile and a half from downtown hotels) from Monday, Oct. 20 through Friday, Oct. 24. It will be open on Monday, Tuesday and Wednesday from noon until 10:30 p.m. On Thursday and Friday the hours are 10:00 a.m. to 6:00 p.m.

For a listing of Metal Show exhibitors, with booth numbers see p. 328.

TECHNICAL PROGRAM

NATIONAL METAL CONGRESS

Philadelphia, October 18-24

The technical meetings of the four sponsoring societies will be held in these downtown Philadelphia hotels:

American Society for Metals	Hotel Benjamin Franklin
American Welding Society	Bellevue-Stratford Hotel
Institute of Metals Div., American Institute of Mining & Metallurgical Engineers	Hotel Adelphia
Society for Non-Destructive Testing	Hotel Sylvania

AMERICAN SOCIETY FOR METALS

Monday, Oct. 20, 9:30 a.m.

HIGH TEMPERATURE PHASES

Microconstituents in High Temperature Alloys — H. J. Beattie, Jr., physicist, and F. L. VerSnyder, metallurgist, General Electric Co., Thomson Laboratory, West Lynn, Mass.

Sigma Formation and Its Effect on the Impact Properties of Iron-Nickel Chromium Alloys — A. M. Talbot and D. E. Furman, Research Laboratory, International Nickel Co., Inc., Bayonne, N. J.

Mechanism of the Carburization of Some Stainless Steels—J. B. Giacobbe, metallurgist, Superior Tube Co., Norristown, Pa.

The Electrolytic Separation and Some Properties of Austenite and Sigma in 18-8-3-1 Chromium-Nickel-Molybdenum-Titanium Steel — T. P. Hoar, Dept. of Met., University of Cambridge, England, and K. W. J. Bowen, Research Dept., Imperial Chemical Industries, Birmingham, England.

Monday, Oct. 20, 2:00 p.m.

CREEP RUPTURE AND RECRYSTALLIZATION

Creep-Rupture and Recrystallization of Monel from 700-1700° F.—N. J. Grant, associate professor, and A. G. Bucklin, staff member, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Influence of Grain Size on High Temperature Properties of Monel—Paul Shahinian and J. R. Lane, members of the Metallurgical Division, Naval Research Laboratory, Washington, D. C.

Creep and Rupture of Chromium-Nickel Austenitic Stainless Steels —E. J. Dulis, G. V. Smith and E. G. Houston, Research Laboratory, United States Steel Co., Kearny, N. J.

Recrystallization and Grain Growth in Alpha Brass — S. L. Channon, Kaiser Aluminum and Chemical Corp., Spokane, Wash., and H. L. Walker, Head, Department of Mining and Metallurgical Engineering, University of Illinois, Urbana, Ill.

Tuesday, Oct. 21, 9:30 a.m.

PHASE TRANSFORMATION

The Effect of Composition on the Temperature of Spontaneous Transformation of Austenite to Martensite in 18-8 Type Stainless Steel—G. H. Eichelman, metallurgist, American Brass Co., Waterbury, Conn., and F. C. Hull, manager, Metallurgical Section, West-

inghouse Electric Corp., E. Pittsburgh.

The Effect of Silicon on the Tempering of Martensite—A. G. Allten and P. Payson, assistant director of research, Crucible Steel Company of America, Harrison, N. J.

The Mechanism and Kinetics of the First Stage of Tempering—C. S. Roberts, Metallurgical Laboratories, Dow Chemical Co., Midland, Mich., B. L. Averbach, assistant professor and M. Cohen, professor of physical metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

The Order Disorder Transformation Viewed as a Classical Phase Change—F. N. Rhines, professor of metallurgy, and J. B. Newkirk, Carnegie Institute of Technology, Pittsburgh.

Tuesday, Oct. 21, 2:00 p.m.

HARDENABILITY

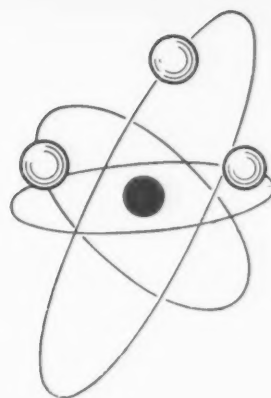
An End-Quench Test for Determining the Hardenability of Carburized Steels — F. X. Kayser, research metallurgist, and R. F. Thomson, head, Metallurgy Department, Research Laboratories Div., General Motors Corp., Detroit.

The Influence of Boron on Case Hardenability in Alloy Carburizing Steels — C. F. Jatzak, research metallurgist and E. S. Rowland, chief metallurgist engineer, Timken Roller Bearing Co., Canton, Ohio.

Turn to Page 356

ASM SEMINAR

This year's seminar will be on "Modern Research Techniques in Physical Metallurgy." It will be held on Oct. 20 and 21, morning sessions at 9:30; afternoons at 2:00 in the Benjamin Franklin. It will cover: Metallographic, diffraction, mechanical, ferromagnetic and radioactive methods.



Metals For Tomorrow

Except for their use in some cases as alloying elements these metals were little known just a few years ago. Today, because of their availability in the free world and because of research into their properties and use they promise to become the metals of tomorrow. At the moment, many of them are either difficult or expensive to produce in usable form. In some cases demand exceeds the supply available in refined form; in others the supply potential is good but more study of the characteristics of the metal and their possible uses is needed.

What is their availability; what are their properties and prospects; where can they be obtained and at what price? This report is designed to answer these questions for the metalworking executive and the metallurgist, for researchers and government officials; for all, in short, who realize that the promise of technology is the hope for the future.

Of course there is no suggestion that the wider use of the "uncommon" metals will be at the expense of the bread and butter metals of today. Aluminum, magnesium, iron and steel will continue to expand tremendously in the years ahead.

These articles, except titanium, are based in part on sections of the Report of The President's Materials Policy Commission.* The sections selected from this report—Cerium, Germanium, Lithium, Selenium, Molybdenum, Vanadium, Silicon and Zirconium—were compiled by the Battelle Memorial Institute, Columbus, Ohio, in August, 1951 and have been completely revised for this issue by the Battelle staff, which has also contributed valuable advice on the first article, titanium.

*Resources for Freedom, Vol. IV, The Promise of Technology, U. S. Government Printing Office, June 1952.

Cerium 288

Germanium 289

Lithium 290

Molybdenum ... 280

Selenium 283

Silicon 282

Vanadium 285

Titanium 260

Zirconium 286



MAJOR SPONGE producing locations in the United States.

Titanium

our No. 1 problem metal

D. I. Brown
Technical Editor
THE IRON AGE

Sponge Making Process . 262

Test Applications 264

Fabricating Methods . . . 268

Forging Practice 270

Welding Techniques . . . 275

Machining Methods 278

Part I

Perplexing engineering and commercial problems confront our new budding industry. All the glamour is gone—having been replaced by stark realism of metal production and use. Hundreds of test applications are being tried but few actual parts are in production. The titanium parts in jet engines are still on the ground—none have yet flown. Fabricating methods are being perfected but welding, particularly of the titanium alloys still presents a major problem because of low ductility. Titanium is still a war baby and government pressure for more capacity will continue. Although at the moment there is an oversupply of sponge, one good sized production order could deplete our stockpile of sponge.

All the glamor has worn off titanium. Today the metal is tarnished with a host of confusing problems all the way from sponge making to eventual use as a fabricated part. The technical and engineering problems, while difficult are no more perplexing than the commercial problems.

Commercially the chief wonder left in our "Wonder Metal" is that the producers wonder when they will get some real orders; the users wonder when they will get deliveries of orders placed months ago; the government wonders how long they can continue to say that there is a shortage of sponge when their stockpile of sponge continues to increase and everybody is wonder-

ing who will come up with what kind of a new process which will antedate the Kroll method and/or cut the present high price of the metal.

The attempt to cram into a few years the huge development of an entirely new metal industry which would ordinarily take a decade to accomplish, is mostly responsible for all the present paradoxes. In the order mentioned; the producers problems are three fold: (1) better quality of the metal, which in 2 years has improved tremendously, (2) more and larger orders to perfect their manufacturing processes and establish a rational flow of business based on repeat orders not test lots and (3) on which of the many possible types of titanium alloys should they con-

centrate their efforts.

The consumer's three major problems are: (1) how to justify on an economic basis the application of a metal that costs at least 10 to 50 times that of present materials, (2) how to adopt present fabricating techniques and develop new methods to be able to actually make titanium parts on a production basis, (3) when will the metal be readily available in large enough quantity and consistent enough quality to work out items (1) and (2).

The government is strictly in the middle, having to step in last October through Defense Materials Procurement Agency and subsidize sponge production else the chief supplier quit production for lack of a market. Prior to that, in April 1951 Ordnance Corps had resuscitated the metal producers by placing orders for 62½ tons of titanium in various forms which was used for test purposes in their large scale research program. Table I shows approximately how much money the government has invested to date in our war baby, titanium.

The major problems still facing government are: (1) How much more money shall they set aside to keep the Kroll process going when private industry refuses to invest in this process but is spending millions to find a new titanium production method. (2) Based on tests and use to date what should the titanium production or consumption target be 2, 3 or 4 years hence. See Table II. (3) Should they advance more help and money to consumers of the metal and (4) which comes first the chicken or the egg, i.e., (1) or (3).

Present high cost big drawback

None of these problems are straightforward. Conditions vital to each problem are changing constantly. Back of all of them are engineering and technological peaks yet to be assailed before the logical goal can even be sighted.

The present high cost of the metal is basic to all our present problems. If it were not the length of the tenure of the Kroll process would not be in question and all our efforts would be centered around making this production process continuous, more economical to run, etc. Table III shows the annual sponge production. Sponge production is not synonymous with metal production. The actual ingot tonnage melted from the sponge produced to date is not known.

The making of titanium is much more closely allied to our chemical industries than that of our other major metals. The companies now in basic metal production are shown in Table IV. From the list of those searching for new methods, Table V, it would appear that titanium production will continue to be closely associated with our chemical industries for some time. A truly continuous electrowinning process offers as

TABLE I

FEDERAL GOVERNMENT'S INVESTMENT

New sponge plant to be built by Dupont	\$14,700,000
Rebuild Henderson Nev. Plant to make sponge, Titanium Metals Corp.	15,000,000
Fund to stockpile sponge until demand catches up with supply—DMPA	5,000,000
Research Programs led by various agencies like Ordnance Corps Air Force U. S. Navy Bur. of Ships, Bur. of Air, etc.	15,000,000*
	\$49,700,000

*Estimated.

TABLE II

ESTIMATED SPONGE REQUIREMENT*

1952	15,000 tons
1953	20,000 tons
1954	22 25,000 tons

* At the moment there is an oversupply of sponge.

TABLE III

ANNUAL SPONGE PRODUCTION NET TONS

1949	negligible
1950	60 tons
1951	495 tons
1952 (first 6 months) (est. for year)	500 tons 1500 tons

TABLE IV

SPONGE PRODUCERS AND NEW CAPACITIES

Company	Present Production on Annual Rate	Planned Capacity tons per year	Location
Dupont	900 tons	3600 by 1954	Newport & Edgemoor, Del.
Titanium Metals Corp.	550 tons	3600 by ?	Henderson, Nev.
U. S. Bureau of Mines .....	.....	360 this year	Boulder City, Nev.
Crane Co.	9 tons	21 this year	Chicago, Ill.

many or more engineering problems than that of the present batch type magnesium reduction process which, in both cases, only the chemical industry, or more precisely the pigments industry, has previous experience, similar equipment and trained personnel.

The fact that one large organization gave up research on electrowinning methods and is again looking at a method not unlike the old iodide method in the hope of making massive metal cheaper merely emphasizes the fact that probably no new process will appear soon to replace that perfected by Dr. Kroll of the U. S. Bureau of Mines in 1946. A schematic outline of the modified magnesium reduction process representative of present sponge making practice is shown in Fig. 1, next page.

(Text Continued on Page 264)

MODIFIED MAGNESIUM REDUCTION PROCESS

A

The rutile is compressed into briquettes. This charge material is dumped into the 25-ft high retort shown schematically below. Chlorine from the Magnesium cells plus a certain amount of makeup chlorine is piped into the retort where the titanium tetrachloride is made. These retorts operate at 800°C. Heat is supplied by 6 electrodes in the bottom of the refractory lined retort. The electrodes are covered with a bed of graphite. The resistance of the graphite bed to the current furnishes the necessary heat. Power requirements are not high, being estimated at close to 1 KWH per lb of titanium tetrachloride produced.

The vapors formed in the retort are piped out of the top of the vessel through an 8" diam pipe. These vapors are condensed and purified into a heavy colorless liquid titanium tetrachloride which looks like water, and stored for use as needed.

Heavy walled stainless steel retorts of the shape shown are used for the magnesium reduction step in the process. The half cylinders are bolted together through a flange at the center as indicated, and crimped stainless steel strip has been used as gaskets in this joint. These joints must be air tight to maintain the inert atmosphere inside the retort. The 1½ in. wall stainless vessels cost about \$8000 each. Some trouble has been experienced with magnesium corroding the stainless vessels. This intergranular corrosion usually takes place near the top of the retort.

B

In operation, some magnesium is placed in the bottom of the retort. The retort is then bolted

together and placed into position in the balcony, where the flange serves to support the retort in an upright position. Helium gas is pumped into the retort, all the air is purged and propane gas burners are applied to the bottom of the reactor to melt the magnesium charge. Liquid titanium tetrachloride is pumped through the top of the retort at an initial rate of about 400 lb per hr.

C

The reaction starts and further heat is seldom needed as the reaction, $2\text{Mg} + \text{TiCl}_4 \rightarrow 2\text{MgCl}_2 + \text{Ti}$ is highly exothermic. As the reaction progresses, additional Mg is added through the top of the retort through a double trap door as indicated. This arrangement permits charging without admitting air. This Mg is added as solid 2-in. diam bars 12-in. long which are surface ground to remove any oxide formed by weathering. The solid Mg is immediately melted by the heat already in the retort.

Due to the capillary action of the Mg, which causes it to creep up the side of the retort, and because the sponge forms in vertical planes, the big mass of sponge forms in the top half of the retort. The by-product of the reaction, MgCl_2 , runs down from the sponge and collects in the bottom of the retort.

The complete reduction cycle takes 3 to 4 days during which time about 7700 lb of TiCl_4 plus about 2000 lb of Mg is charged. This produces from 1900 to 2000 lb of sponge when the reaction is finally stopped. During the cycle the MgCl_2 is kept molten by the gas burners, if necessary, and

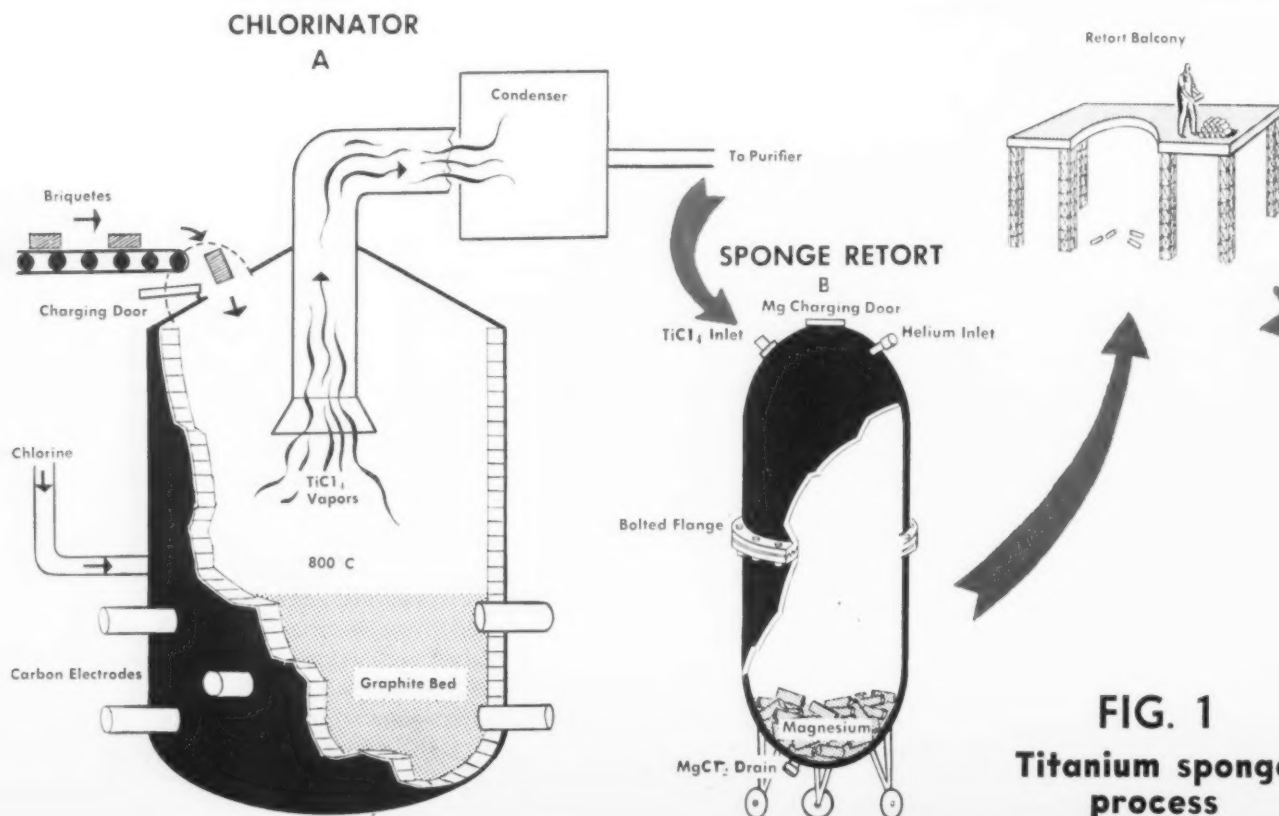


FIG. 1
Titanium sponge process

ION PROCESS FOR TITANIUM

this liquid, $MgCl_2$, is periodically drained off.

The sponge contains 99.5 pct Ti plus entrapped $MgCl_2$ plus any impurities that might have been present in the $TiCl_4$ or of the Mg. When the reduction is completed the helium gas is bled off and vacuum pumps are hooked into a line at the top of the retort prior to starting the distillation process. The sponge must be distilled as $MgCl_2$, and traces of Mg metal and lower titanium chloride are mixed into the sponge.

D

The vacuum distillation process can be run at a variety of temperatures and times. The temperatures necessary to melt the Mg salts depends on the vacuum pressure. At a pressure equal to 10 mm of mercury, the temperatures should run 1100 to 1200°C for a decent time cycle and good purity sponge.

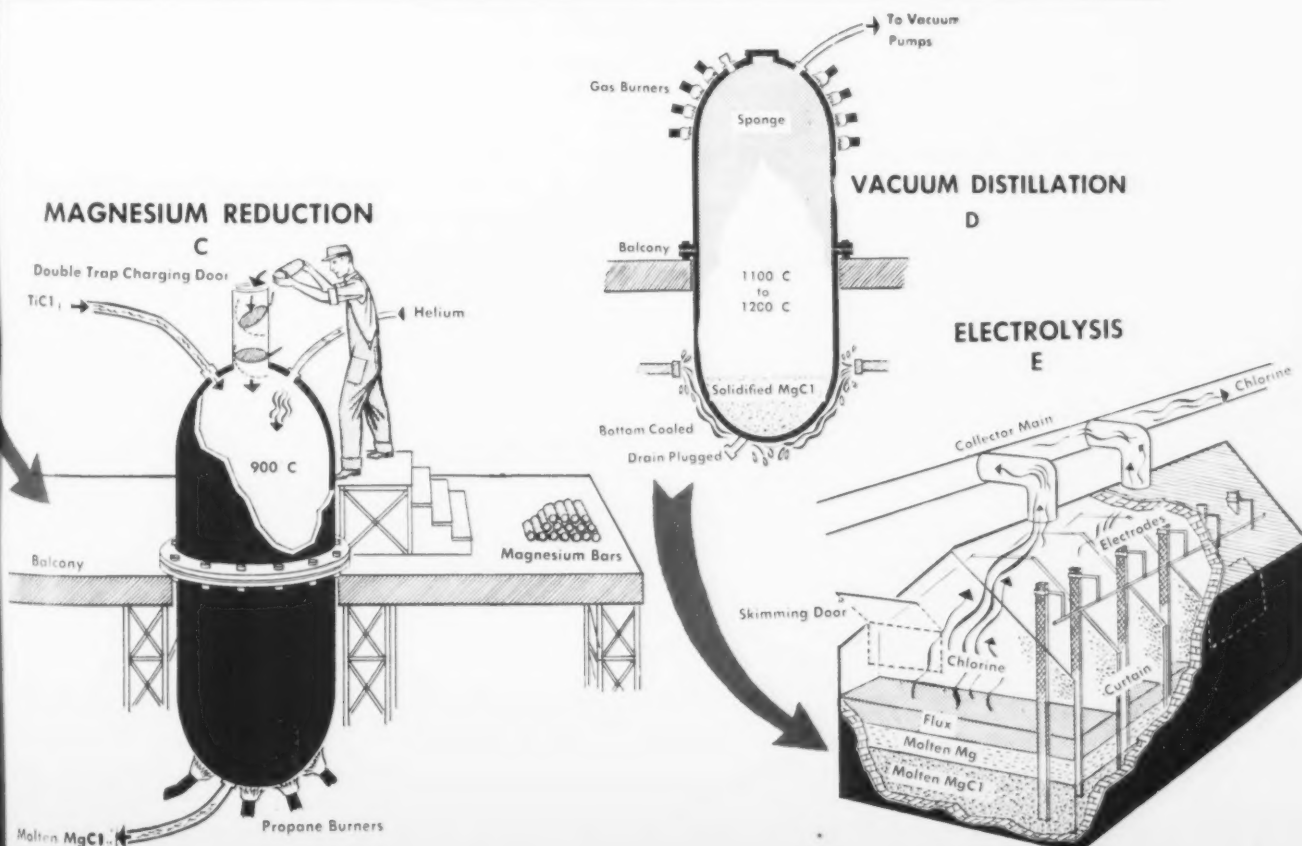
In this operation, shown schematically, the top half of the evacuated retort is gas heated and the lower half is cooled to condense and solidify the $MgCl_2$ that runs down into the lower half of the retort. Because of this method of distillation, the walls of the retort must be thick to support the pressure exerted on the retort else it would collapse.

After the distillation cycle is complete, the retort is cooled. The retort halves are then unbolted and the top containing the sponge is protected from the air and taken to a large boring mill or lathe. Here the sponge is drilled out of the retort with diamond drills and crushed and sized for further melting. Care is taken to prevent oxi-

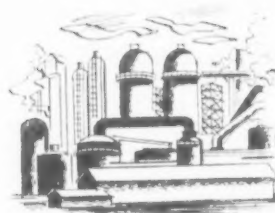
dation of the sponge during machining. Air is excluded from fresh sponge as much as possible and crushing is usually done under controlled humidity conditions. In machining the sponge from the retort about 1 to 1½ in. of hard sponge is left in the steel shell. This helps prevent contamination and corrosion of the retort walls in subsequent runs.

E

The lower half of the reduction retort containing exceptionally pure $MgCl_2$ is then emptied and the $MgCl_2$ is charged into the Mg cells, diagrammed. These cells operate on about 8.3 v per cell. There are 44 cells, which require a total electrical energy of 365 v at 20,000 amps. Six sets of electrodes, cast iron cathode and graphite anodes make up one cell. Ceramic curtains separate the electrodes so that each cell contains 5 curtains. The $MgCl_2$ is charged on the bottom and a flux is added. The molten Mg separates out in a bath on top of the electrolyzed, now molten, $MgCl_2$. The Mg is skimmed off and cooled and is later purified and recharged into the reduction retorts. Mg recovery is good and the chlorine gas raises through the flux and is taken off through 2 cast iron pipes into a main collector pipe system. There are 2 collector pipes to each cell. The chlorine mains collect the gas from all cells and deliver the gas to filters. Gas recovery is not 100 pct and makeup chlorine, must be added along with the cell gas to the reduction retort. The power consumption of these Mg cells run about 9 KWH per lb of Mg produced, which is not much more than that used in the Dow type cell.



Experimental Titanium Applications



This article will start with test applications of titanium and the fabrication methods. Sponge making, melting and casting problems as well as an evaluation of some research programs will be discussed in detail next week in Part II of this article.

A quick recap of the status of titanium in the major fields of application is necessary in order to intelligently assess the present position of the metal. Too much early enthusiasm and ill considered statements have confused the industry. Actual supply and demand conditions have most often been cast aside by those who prefer to think of the tremendous future market potentials of the metal.

Supplies of titanium in product form from the producers shown in Table VI are adequate to meet today's demands for unalloyed metal. Supplies of alloys for forgings are also adequate, but deliveries of alloys in sheet form remain extended. Wire and tubing are hard to get. There is a surplus of sponge as well as a surplus of melting capacity but there is a general shortage of orders. Despite the repeated predictions of new processes which will greatly lower the present prices, no actual process has yet appeared to substantiate these claims. This does not mean that metal produced by magnesium reduction won't continue to decrease slowly.

Titanium is inherently an aircraft material because of its relatively high strength weight ratio. This characteristic is particularly valuable in reciprocating parts. Unalloyed titanium, however, does not compete with aluminum or magnesium in most aircraft applications unless temperatures of over 200° to 300°F are involved. The one exception to this general rule at present is fuming nitric tanks. Here titanium is a justifiable substitute for aluminum if the tank must function above 120°F for extended periods.

Commercial purity titanium does offer attractive weight savings when used to replace 18-8 stainless. In these cases the required strength levels are usually around 35,000 psi min. Y.S. In the alloy grades of titanium also there are many more cases where the metal will replace aluminum and stainless because of the higher strength weight ratio characteristics of the

TABLE V

TITANIUM SWEEPSTAKES

Companies
Monsanto Chemical Co. &
National Research Corp.

Dow Chemical Co.

Dupont

National Lead Co.

Horizons, Inc. }
Ferro, Corp. }

Kennicott Copper Co.

American Cyanamid Co.

Chicago Development Corp.

Glidden Co. & Bohn Aluminum Corp.

Metal Hydrides Corp.

Union Carbide & Carbon Corp.

WIN

PLACE

OR

SHOW

TABLE VI

SUPPLIERS OF TITANIUM MILL PRODUCTS

	Bars	Billets	Plate ¹	Sheet	Strip	Rod	Wire ²	Alloy Designations
Rem Cru Titanium, Inc.								
Unalloyed	✓	✓	—	✓	✓	✓	✓	RC 130A,
Alloys	✓	✓	✓	✓	—	✓	✓	RC 130B
Titanium Metals Corp.								
Unalloyed	✓	✓	—	✓	✓	✓	✓	Ti 150A, Ti 150B, Ti 140A ⁴ , Ti 175A ³
Alloys	✓	✓	✓	✓	✓	✓	✓	
Mallory Sharon Titanium Corp.								
Unalloyed	✓	—	—	✓	✓	✓	—	MST 3A1-5Cr, 2.5 Fe-2.5V 2A1-2Fe
Alloy	✓	✓	—	—	—	✓	—	
Republic Steel Co.								
Unalloyed	✓	✓	✓	✓	✓	✓	✓	RS 110,
Alloy	✓	✓	✓	✓	✓	✓	✓	RS 120

Welded and cold drawn tubing available from Superior Tube Co., Norristown, Pa., and Trent Tube Co., East Troy, Wis., Subsidiary Crucible Steel Co. of America. Tubing available in unalloyed grades only.

¹ Anything above 3/16 in. thick.

² Smallest diam. in alloy wire 0.100 in.

³ Temporarily off the market.

⁴ New alloy 1.5 to 2.5 Fe, Cr & Mo 0.05 C Max. 0.08 N; Max.

TABLE VII

POSSIBLE MILITARY AIRCRAFT APPLICATIONS

Parts requiring 80,000 to 100,000 psi U. S.
Unalloyed Titanium

Application	Weight Required per Airplane—lbs	Approx. Weight Saving per Airplane—lbs
Nacelle area (firewalls, tail cones, fairing, cowling, etc.)	682	230
Hydraulic tubing ¹	127	43
Pneumatic system ¹	1875	625
Nacelle area (firewalls, tail cones, fairing, cowling, etc.)	610	380
Anti icing (ducts) ¹	435	145
Nacelle area	75	21½
Shroud	1072	1072
Firewalls, cowling, ducts, fairings	989	989
Firewall, nacelle fittings	25	25
Bulkhead	50	20
Bulkhead	37.5	15
Substitution for annealed stainless steel sheet	270-1100	200-800
Shrouds, firewalls, etc.	20	14
Fire and radiation shields	40	28
Armament	600	300
Shrouds, fire and radiation shields	195	90
Shrouds, fire and radiation shields	400	280
Firewalls, shrouds, misc. power plant items now stainless steel	100	100
Outer tail pipe, firewalls, air ducts and ammunition boxes (these items now stainless)	142	142
Fuselage sheet metal parts such as shrouds, firewalls, etc.	65	8
" " " "	65	65
" " " "	34	34
" " " "	23	23
Keel web, pod firewall	70	70
Ammunition boxes, ejection chutes, blast tubes, ejector cones, misc.	141	141
Ammunition boxes, wing shield	20	20
Bolts, screws	515	344

Parts Requiring 130,000 to 150,000 psi Ultimate
Strength Titanium Alloys

Nacelle area	727	240
Landing gears	2550	850
Wing area (fittings)	525	175
Flap track and carriages	810	270
Body area (bulkhead fittings, etc.)	2060	690
Steel fasteners	2100	700
Nacelle area	690	230
Landing gears	2975	992
Wing area (fittings)	176	59
Flap tracks	286	96
Body area (fittings)	112	149
Steel fasteners	1050	350
No applications foreseen with present designs		
Primary and secondary structure		669
Primary structure		293
Bulkhead	87.5	35
Fasteners in general, bolts, screws, nuts, hi-shear rivets	2376	1470
Fasteners in general, bolts, screws, nuts, hi-shear rivets and some sheet applications	792 (bar) 500 (sheet)	800-900
Substitution for annealed and 1/2 H stainless steel	270-1300	200-1000
Substitution for bolts	70-270	50-200
Fittings, bolts, etc.	20	15
" " "	60	40
" " "	40	20
" " "	60	40
Small fittings now steel		15
Small fittings now aluminum		15
Hull skin		40
Floors		38
No worthwhile applications		Negligible
General fuselage sheet metal structure such as frames, longerons, etc.		65
" " "		29
" " "		25
" " "		510
" " "		21
" " "		80
Keel web, pod firewall		4.6
A B Turbine pump outlet		6.8
16th stage compressor air	12.7	18.6
16th stage comp. leakage	8.0	12.0
Acceleration bleed	13.0	20.0
Engine shroud	15.0	22.0
Keel cap	109.0	81.0
Keel web	131.0	96.0
Engine burner shroud	31.7	46.8
Engine exhaust shroud	9.3	13.6
Fuselage floor shielding	45.0	66.0
Fwd fire seal	4.6	6.8
Aft fire seal	2.9	4.2
Aft exhaust web	1.2	1.6
Aft bulkhead	1.2	1.6
Stat tracks, high temp. bulkhead, etc.		94

Above survey made by Aircraft Industries Association.

alloys. Table VII is a summary of military aircraft parts for which titanium is being considered. The only stated requirements of titanium products like sheet, bar, plate, etc., for current and future military demands have been offered by NPA. These requirements by weight are classified but percentage breakdown of all requirements are shown in Table VIII. At the moment, it appears that about 30 pct of military aircraft requirements is unalloyed metal.

Early applications of titanium to military aircraft were instigated mostly by the aircraft companies despite the indifference or lack of concrete help from others, notably Air Force. Lately, Air Force has taken a more vital interest and has placed some important research projects, see THE IRON AGE, Aug. 7, p. 63. While Air Force was backing basic research into phase diagrams and welding problems the aircraft industry was struggling to get deliveries, and trying to fabricate poor quality material.

There is no single figure that can be used to express the premium in dollars that can justify the use of titanium in aircraft. Each part on each plane, in fact the same parts on a single plane present different economics depending on the current weight status for a given design completion. In the past, the aircraft companies have even had to double design because of the erratic supply of titanium.

The only rational method to use in approaching the use of the new metal for aircraft is to start with mission load divided by cost of the aircraft and adjust this price per lb for design completion and current weight status. As the ship nears completion and if the weight margin is tight, a premium of hundreds of dollars per lb of parts might very well be justified. Should the ship be completed well below the guaranteed weight there is no sense in shoving in light, costlier parts unless this weight advantage can be actually used in its missions. In the case of one Navy fighter, the titanium premium ranged from \$20 to \$52 per lb of part during one stage of design. Many of the present test applications on titanium parts are being used for engine shrouds. Fig. 2 shows the experimental engine shroud being tested which is somewhat typical for the industry.

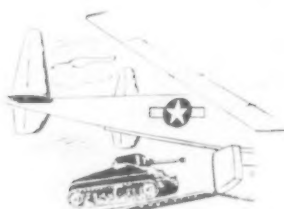
Merely saying that titanium in sheet, or bar

TABLE VIII

PRODUCTS REQUIREMENTS BY PERCENT
NPA estimate

Sheet, strip and plate	29.4 pct
Bar, rod and wire	8.7 pct
Forgings	58.8 pct
Extrusions	1.9 pct
Tubing	2.9 pct
Powder	.2 pct
Sponge	.1 pct

Ordnance leads titanium parade—



form, is worth a \$20 or \$30 or \$40 premium per lb for each lb it reduces military aircraft weight is fallacious. The costs must be compared on a *fabricated part basis* else someone lose their shirt by forgetting that welding, forming, machining, straightening, grinding, etc. (which are discussed in detail later), costs much more at the moment when working with titanium than the other aircraft metals. These fabricating costs, as well as the price of the metal, will come down but until titanium prices are more nearly competitive, see Table IX, the *cost per lb of fabricated part*—rule will hold.

The fact that titanium has been applied to one commercial aircraft, the DC-7 does not mean that the metal has arrived as a regular material in this field. Douglas Aircraft is using 1000 lbs of RC-70 Ti sheets per ship at a weight savings of 400 lb per ship. These sheets which range in thicknesses from 0.016 in. to 0.051 in. are being fabricated into engine nacelles. Titanium is being used in this plane for only two reasons, (1) The company is anxious to get experience in design, fabrication and use of the metal, (2) titanium on commercial aircraft is a fad. For these reasons other builders of commercial aircraft will follow, but based on today's mission load, ship design and price of titanium, none of these applications are economic and the use will be restricted to very small amounts.

In the case of the DC-7 the titanium sheets

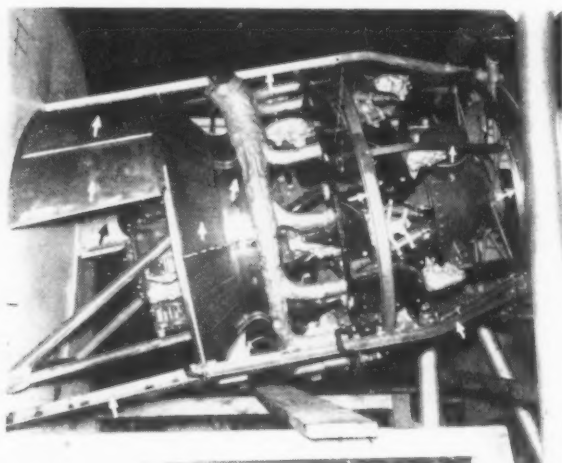


FIG. 2—Titanium engine shroud parts now under test by Piasecki Helicopter Corp. Spot welded and riveted fabrication methods are employed. All material is RC-70.

could only be justified economically if they could be obtained at somewhere around \$7 to \$8 per lb. Replacing steel bolts on one commercial aircraft with titanium alloy instead of 0.30 to 0.40 C alloy steel at 160,000 pss U. S. level would save 1000 lbs in the present design. Chief trouble is that hot headed bolts with rolled threads and a cold rolled shank would probably be needed, and such bolts cost a lot of money.

Titanium as yet is a war baby. For this reason military use has been and will continue to be the primary market until price of the metal gets down to around \$2 to \$3 per lb in product form. Commercial aircraft, therefore, does not now offer a big market. In the first place there are only 1260 total aircraft owned by all of our commercial airlines at present. All told we have 50,000 single engine non-military planes and no justifiable titanium applications have been advanced for these craft to date based on today's metal price.

Naval applications not yet firm

The glowing reports of the potential tonnage for marine applications, because of titanium's excellent corrosion resistance, don't look much better either for the immediate future when the hard facts are appraised. We have the world's most powerful Navy already built, some of it afloat. The Navy is vitally interested in the new metal but that doesn't mean that Navy is ready today or even next year to pull apart seagoing vessels or those in moth balls and rebuild both fleets. Merchant marine craft are in a similar category. It would appear that titanium will find its logical place in new naval craft as these vessels are built and the material tested and evaluated, but the applications will not be in big tonnage for some time to come.

The chemical, food processing and petroleum industries present a somewhat brighter prospect. The titanium producers are looking at these fields with much more hope as the corrosion, contamination and working temperature problems imposed on metals by many processes in these fields can be greatly alleviated by using titanium. Many of these applications can be justified economically even at today's prices, and a slight drop in metal price would bring in many more possibilities.

Ordnance Corps, under the guidance of Col. Mesick, Commanding Officer, Watertown Arsenal, has about 100 research projects under way. On Sept. 1 their first firm application for 81 mm mortar base plates was announced. As yet their tonnage requirements are light, however the whole mortar base replacement program will take many tons of unalloyed heavy gage sheet. The base plate shown in Fig. 3 is a welded job and includes 3 forgings. A host of other applications, from wheels to guns, are under consideration. Typical are the parts in Fig. 4. Airborne ve-

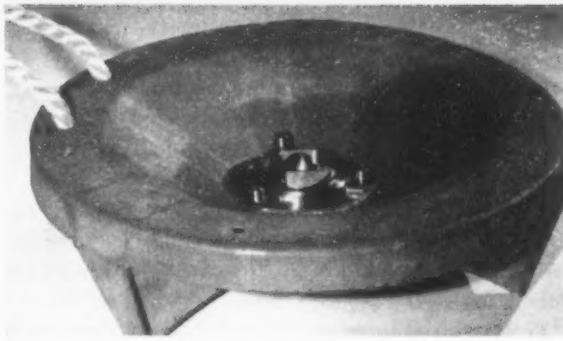


FIG. 3—This titanium, 81 mm mortar base plate has been adopted by Ordnance Corps as a standard item. An all welded assembly, the base plate contains 3 forgings, 2 of which are fully machined. The plate in titanium weighs 22½ lb and replaces a steel plate weighing 48 lb. RC-70 0.100 in. thick is cold flanged and hot dished at 1100°F, to form the top section. The three locking bolts are also of titanium.

hicles, and the trend to make each soldier a walking arsenal, point to the fact that eventually Ordnance will be the real tonnage user, but not until prices come down. Here, as in military aircraft, the actual demand will be governed by conditions which cannot be predicted with accuracy.

Two Ordnance specifications issued on July 15, 1952, outline generally their metal and sponge requirements. The mechanical property levels of the six classes of material are cited in Table X. These properties require, in some cases, high purity sponge of 140 max. Bhn, which as yet can only be secured from U. S. Bureau of Mines.

Basically, missiles, rockets and high temperature skin applications fit into a special category in which some clarification in thinking is necessary. None of the titanium produced to date can be considered a high temperature material. Melting temperature of titanium, see Fig. 5, and strength at temperature, are not even remotely connected. Designers can only use titanium for structural applications up to about 800°F max. In this sense the metal can replace aluminum and magnesium but at higher temperatures the steels are still the only usable materials.

Another more important factor that needs clarification is that a metal for missile use need not be a high strength, high temperature metal. The temperature at which a missile operates depends on the type of missile and many may oper-

TABLE X

ORDNANCE YIELD STRENGTH AND BEND REQUIREMENTS*

Class	Yield Strength Psi	Bend Radius [†]
40	40,000 55,000	1T
50	50,000 80,000	2T
75	70,000 100,000	3T
100	100,000 130,000	3T
120	120,000 150,000	5T
150	150,000 minimum	7T

[†] T—Thickness of the Material.

* Specification MIL-T-12117.

ate at speeds and under conditions that magnesium or plastics can fulfill. Here again, it would appear that to date titanium has been somewhat overstressed and misunderstood as an engineering material.

A case in point, relative to the whole realm of supersonic equipment and flight conditions, was a plane recently tested: Everyone was worried about how to keep the temperatures down, particularly that of the pilot. As it turned out, the problem was in reverse; allegedly, he almost froze to death.

Some fields not yet investigated may show promise of rather high titanium consumption. One in particular is that of diesel truck engines. In many cases the weight limitations are serious not only to pay load and engine size but to the many other restrictions placed on large highway vehicles. Conceivably, the metal could be used to advantage either as structural or reciprocating parts. Both the other light materials, magnesium and aluminum, have been fully investigated and in most cases have not worked too well in such applications. Stainless steel trailers are now standard equipment and here again titanium might find good use. In the motor carrier field, the tonnage potential is much greater than that of commercial aircraft, but here again, high metal costs is the big hurdle which will have to be overcome.

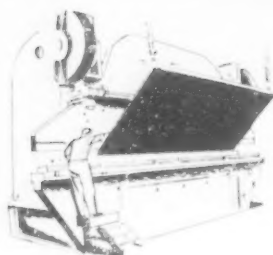
FIG. 4—The all welded outrigger made of unalloyed titanium top, weighs 25 lb. The same part in steel, bottom, weighs 43½ lb. Ordnance Corp. expects that applications of this type will soon be commercially feasible. No production difficulties were encountered in making the titanium prototype.



TABLE IX

COMPARABLE AIRCRAFT SHEET COST (mill quantities)

(average for 48" x 144" size, same gage)	
Aluminum	60 to 70¢ per lb
18-8 stainless	90 to 1.10 per lb
Unalloyed Ti	\$17 to \$25 per lb
Alloyed Ti	\$25 to \$30 per lb



Fabricating Titanium

Fabrication of sheet forms of unalloyed and alloyed titanium have presented some unusual problems. A summary of all experience to date indicates that in bending, stretching, rubber pad forming, dimpling, etc., that titanium behaves more like magnesium than aluminum. One of the earliest disappointments in working the metal was the 20 pct average elongation values obtained by tensile testing standard sheet specimens proved misleading. It was found the metal did not work harden in the plastic range which resulted in premature necking and fracture. The

Titanium	302 stainless	24St Aluminum
30 min	30 min	30 sec

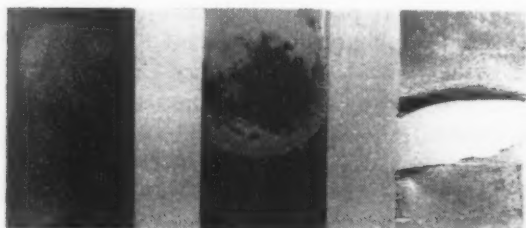


FIG. 5—Evidence of titanium's resistance to heat is the above test results. All samples were exposed to 2000°F flames for times shown.

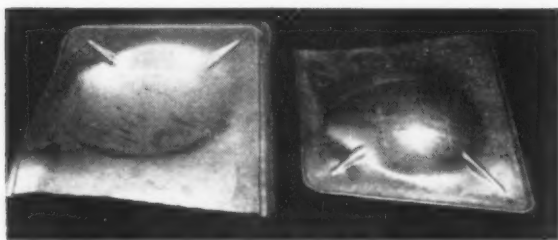
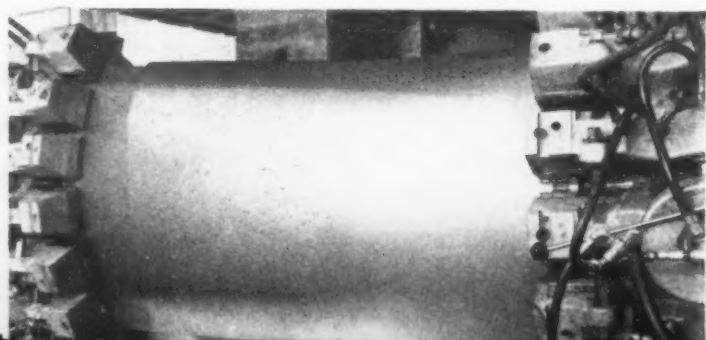


FIG. 6—These parts, made by North American Aviation, Inc., were started on a hydraulic press using the lower half of drop hammer die and rubber pressure pad. Parts were heated to 1000°F and hit several times.

FIG. 7—Unalloyed sheet 0.025 in. thick being contoured on a Hufford Stretch Press at North American plant.



high yield to ultimate strength ratio as well as its hexagonal lattice are basically the cause of the forming difficulties with titanium.

Successful hydraulic and punch press forming of both alloy and unalloyed titanium between 800° and 1000°F have been previously reported on these pages¹. The fundamental mechanical and physical properties of unalloyed and alloy titanium have been well publicized. These data are available in hand book form from all the producers and were recently republished².

Power brake forming of the metal can be done reasonably well by maintaining punch and dies at 500°F with the metal heated to 850° to 875°F. Because light gage sheets tend to leave the punch and seek its own radius, forming into a rubber pad is often necessary. Kirksite dies obviously cannot be used because of lead pick-up and forming temperatures. The regular Kirksite dies used for 1/4 hard stainless forming might be used if they were plated to prevent lead pick up. For production runs, however, cast iron or steel dies will have to be used. Generally, a bend radii of 3 1/2 T can be made on annealed sheet by hot forming practice.

Hydraulic press forming is done with steel dies and form blocks are usually heated to about 200°F. The part is heated to 800°F to 1000°F and asbestos sheet is used to protect the rubber pad from burning. Fig. 6 shows two aircraft parts which were started on a hydraulic press and finish formed on a drop hammer. When hot forming the usual form blocks used for 1/4 hard stainless are satisfactory. The biggest trouble with rubber pad formed titanium parts is encountered on the shrink flange. The metal will not shrink because of its low compressive yield strength limitations and when formed cold the parts either break or require excessive hand forming along the shrink flange. Some companies have licked this problem by cutting V-shaped notches along the shrink flange radius of the blank prior to forming.

Experience in stretching of titanium into shapes has indicated that a number of precautions are necessary. The critical necking strain of titanium compared to aluminum or 18-8 as measured by O. A. Wheelon³ are 4 to 10 pct for Ti, 12 to 15 pct for 24S-T and 35 to 45 pct for 18-8. The low limit of uniform elongation of titanium partially explains the difficulties experi-

TABLE XI
RECOMMENDATIONS FOR STRETCHED SHAPES

1. Accurate sections prior to stretching should be employed. These could be fabricated by rolling, or power brake and draw bench sizing.
2. Sections should be used with a return flange on the tension side to prevent flange height loss and inhibit any necking tendency.
3. Parts should be split so that regions of high strain with straight or gradual intermediate contour are avoided.
4. The use of high webs should be avoided on severe contours. A maximum of 10 pct stretch should be used, assuming neutral axis is at inner flange.
5. Stretch blocks should be made of steel to permit the use of heat in hand-work.

enced in stretch forming. In Table XI are the recommendations made by Douglas Aircraft.

Ryan Aeronautical Co. also ran quite extensive tests on stretch forming. Using very slow ram movements they found that the annealed Ti 75A, 0.071 in. gage sheets usually broke when stretched to about 1/3 the amount necessary to make the part. These breaks were explosive in nature and occurred at a maximum elongation of around 16 pct.

Combinations of a number of partial stretch-forming operations interposed with anneals at 1350°F for 10 min. produced total elongations up to 20 pct without breakage. However, cleaning of the scaled part is sometimes necessary to prevent press jaw slippage and usually the surface shows a definite orange peel pattern. Hot stretching at low temperatures around 400 to 500°F usually requires 1 or 2 anneals if the total elongation in the metal must be over 20 pct to make that particular part. Higher temperatures around 1000°F preclude the intermediate anneal and make forming easier but are somewhat harder to control and handle. Moderately difficult stretch forming, however, is being done today at around 465°F and it has been found that the same high temperature lubricant used in hot forming magnesium works equally well with titanium.

Stretch forming of skins is not as difficult as shapes but so far tooling costs have been high in regard to the number of parts required. Best contours are obtained by holding the stressed sheet at maximum load. In stretch forming as typified in Fig. 7 more scrap is generated because excess material is needed for gripping. Until sheet prices decrease and a ready market for the excess scrap generated is found it is believed that titanium parts by stretch forming will be high priced in relation to other fabricating methods.

Use rubber pads on drop hammer

Drop hammer stampings common to many aircraft fabricating methods have been used on titanium. The sheet metal duct parts shown in Fig. 8 are common to aircraft manufacture. At times rubber pads are used under the part on the hammer. Some parts are started with rubber pads and then bottomed in the die after the rubber pad is removed. North American Aviation drop hammer forms their parts at 1000°F.

Ryan Aeronautical Co. sums up their drop hammer experience as follows: "As a result of the successful drop hammer forming of the shroud assembly we have concluded that the temperature at the instant of impact should be at least 800°F and preferably near 1000°F to achieve the optimum in formability." Although lead punches and Kirksite dies could be used for a limited number of parts, it was found that the high temperature of the blanks tended to pick up lead from the punch which would shorten its life considerably. Heating of the material for forming is complicated in the case of large, un-



FIG. 8—Titanium ducting parts formed on a drop hammer at 1000°F. Rubber pad was used underneath left hand part to hold shrinkage. Other two parts were drop hammer formed without pads.

wieldy parts. For smaller parts, torch heating, or heating in a standby furnace, have been acceptable methods. In some cases these techniques are employed in the fabrication of stainless steel drop hammer stampings.

There are also advantages in keeping the dies at a moderate temperature to prevent the rapid cooling which is encountered with cold dies. Parts with complex curves will probably require a certain amount of hand work between each draw of the drop hammer. This is essential if there is any tendency for the part to wrinkle.

W. G. Hubbell, Chief Metallurgist of Ryan, recently developed a rather simple test to obtain ductility characteristics of titanium under impact loading at various temperatures such as found in drop hammer stamping work. A spherical cavity $\frac{3}{4}$ in. in diam and $\frac{7}{32}$ in. deep is machined into a steel plate. By measuring the total deformation possible after forcing the sample into the cavity it was possible to obtain a quantitative evaluation coordinated with various heat treatments. A measured impact load is applied in this case to a steel ball which forces the test material into the hole machined in the plate. Typical deformation characteristics developed by using this test on Ti 75-A sheets are shown in Table XII. These sheets as delivered possessed

TABLE XII
DEFORMATION TEST FOR TITANIUM

Deforming Temperature	Treatment	Deforming Characteristics
Room	None	Cracked when deformation was about 50 pct complete.
Room	Deformed 50 pct of possible, annealed 1 hr at 1170 °F. Deformation then completed.	No cracking.
Room	Deformed 50 pct of possible, annealed 40 min. at 1170 °F.	No cracking.
Room	Deformed 50 pct of possible, annealed 20 min at 1170 °F. Deformation then completed.	Cracking appeared imminent.
450 °F.	Previously heated to 1300 °F.	Cracked when deformation was nearly complete.
750 °F.	None	Cracked when deformation was about 75 pct complete.
1000 °F.	None	No cracking.
1300 °F.	None	No cracking.

the following properties: 87:700 psi U. S., 65,000 psi Y. S. and 22 pct elong. in 2 in.

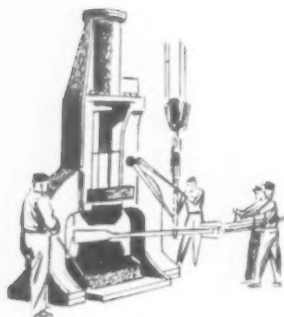
Not enough good data has been developed yet on deep drawing of titanium. Until very recently sheet quality has not been good enough to attempt a general testing program. A few such projects are just getting under way and results will be available in a few months.

Spinning of unalloyed titanium sheets has worked fairly well. One company, Southern California Metal Spinning Co., employs half hard naval bronze tools with excellent results. This company employs two cold preforms each fol-

lowed by an 1150°F anneal. Final spinning is done hot between 475 to 500°F. Butane burners heat the metal and the chuck is preheated.

Sheets 0.062 in. thick are spun with tolerances on the I.D. running 0.010 in. Regular spinning soap is used on the cold preforms but no lubricant is used on the hot finishing spin.

Punch press is not generally recommended for titanium parts. Forming temperatures of at least 800°F are necessary which means that the dies must be redesigned to counter the expansion of these dies at working temperatures. Hydraulic press forming is generally cheaper and easier.



Titanium Forging Practice on Typical Experimental Parts

Most published literature concerning forged titanium have overlooked metal cost and costs of operations subsequent to receiving a finished forging which are necessary in order to use the forging in any given application. Titanium can be forged and in general ranks with aluminum and some stainless grades in this regard. Many parts have been forged, most of them from the titanium grades shown in Table XIII. Forging temperatures, annealing temperatures, etc., have been well publicized but costs of forgings have not received too much attention.

In the case of one aircraft maker a detailed study of costs produced the comparison shown in Table XIV. At these figures the use of the metal is prohibitive in most airframe construction. This part was approximately 20 in. long, 4 in. wide and ranged from 1/2 to 3 in. thick. As machining methods improve the cost of finish forged parts will decrease and will permit wider consideration of titanium in such places. Titanium producers usually cite a machining cost of 3 to 3 1/2 times that of steel parts. Experimental machining tests by consumers have run as high as

10 times, to 20 times that of alloy steels. One of the few published reports which dealt with costs of forging¹ cited a cost increase of 50 pct

TABLE XIV
FORGING COST ANALYSIS—TANK SUPPORT FITTING

Description	8630 Steel	Titanium Alloy RC 130B	
		500	500 ¹
Lot size.....	800	500	500 ¹
Cost of forging stock.....	\$0.10/lb	\$10.00- 13.00/lb	\$10.00- 13.00/lb
Wt. of forging billet.....	.....	19.5 lb	19.5 lb
Wt. of rough forging.....	23.5 lb	13.8 lb	13.8 lb
Material cost forging.....	\$6.00	\$248.82	\$248.82
Forging cost part.....	\$1.90	\$78.18	\$78.18
Total cost of forging.....	\$7.90	\$325.00	\$325.00
Machining cost part.....	\$58.00	\$1000.00	\$174.00 ¹
Total cost finished machined part.....	\$65.90	\$1325.00	\$499.00
Wt. saved/part.....	.....	5.9 lb	5.9 lb
Cost per lb. of wt. saved.....	.....	\$225.00	\$83.00

¹ Analysis based on machining time and costs of 2 1/2 to 3 times cost of alloy steel parts; the machining cost factor usually quoted by the primary titanium producers.

TABLE XIII

NOMINAL COMPOSITION AND PROPERTIES OF SOME TITANIUM FORGING ALLOYS

Designation	Producer	Nominal Composition Pct					Nominal Annealed Mechanical Properties			
		CaCb.	Al	Cr	Fe	Mn	Yield Str. 0.2 pct offset psi	Tensile Strength psi	Elong. pct 2 in.	Red. of Area pct
RC 70.....	Rem Cru.....	0.2 max	.....	.....	.....	.....	80,000	90,000	20	50
RC 130B.....	Rem Cru.....	0.2	4	.....	.....	4	140,000	150,000	20	40
MST 3Al-5Cr.....	Mallory-Sharon.....	0.5	3	5	.....	.....	153,000 ¹	165,000 ¹	8 ¹	25 ¹
Ti 150A.....	Titanium Metals.....	0.02	.....	2.7	1.3	.....	120,000 min.	150,000	15 min.	.....

¹ Hot forged 80 pct reduction.

for material and 100 pct for machining over alloy steels. The use of CO₂ offers promise in reducing costs, but to date more experience is needed before actual machining costs for large part production can be intelligently assessed.

The criticisms leveled at some forgers for what is called excessively high prices of forgings is not exactly fair. In the first place, it must be remembered that the man on the hammer has in the tongs a piece of metal which costs many times as much as ordinary metal forging stock. In the case of one part made of 4340 the forging was worth 45¢, the same part in titanium cost about \$60 to \$70. A forger can absorb reasonable scrap in the first case but what can be considered reasonable scrap losses in the second case? In addition the forgers have a ready market for practically all steel and aluminum scrap but he has no market at all for titanium scrap so that a rejected titanium forging is 100 pct loss.

Hammer time for titanium forgings is not much more than on stainless alloys although 2 or 3 heats are common in forging one titanium part. In forging of jet blades as many as 10 reheats are not uncommon. However, these costs are negligible to material costs. Some alloys can be reheated repeatedly without impairing the properties of the forgings. Other alloys are sensitive to reheating as well as to soaking at temperatures much over 1650°F.

The maximum weight savings of 40 pct in using titanium alloy forgings should come from substituting titanium alloys of equal strength to the steel alloys now employed. In airframes this strength range will generally vary from 120,000 to 150,000 psi U. S. If the part can be designed to take advantage of higher tensile strength, alloys up to about 175,000 psi U. S. can be used to better advantage but so far very few such high strength titanium forgings have been made. Fig. 9 shows a group of small drop forgings typical of parts forged by one company which are now being considered for regular production.

Landing gear application questionable

The application of titanium to landing gear forgings is being tested but two major drawbacks are involved in addition to high metal and machining costs. Such forgings must be fairly weldable and possess very high strength. One company regularly employs Crucible Hy-Tuff for large landing gear and this material is heat treated to tensile strength of 220,000 to 230,000 psi with 15 pct elongation in 2 in. AMS 4340 steel also used for landing gear has equally high strength and can be welded. Both metals are cheaper, stronger, more readily fabricated than any titanium alloy yet developed so that titanium in these applications has to compete with materials of higher strength, weight, ratios.

Present impact requirements on heat treated

steel landing gear vary considerably. One company makes large gear of alloy steels which are welded and heat treated. The impact properties are quite low but this drawback is alleviated by proper design. It would appear that titanium might make the grade for landing gear forgings if the designers can conjure up an assembly wherein the brittle titanium alloy welds will not impair the safety of the gear.

One company, Steel Improvement & Forge, has forged numerous titanium parts weighing from 0.19 to 594 lbs. The three major factors concerning forgings in their experience are part design, die sinking and raw material. The bulk of their production has been in the rotor disk forgings of the alloys Ti-150A, Ti-175A, MST 3A1-5Cr and unalloyed RC-70 and Ti-75A.

In forging close attention must be given to the flow characteristics of the material. The metal, while sluggish, usually exhibits normal flow characteristics, although there is a distinct tendency to extrude through thin section rather than follow the die contour, making it difficult to fill rim sections or bosses, when using conventional design. For this reason it often requires additional dies of more extended design, or possibly intermediate dies, for a forging previously made in steel, to be converted to titanium.

Also attention must be given to the selection of a proper die block size and hardness range. Generally speaking, titanium requires approximately 30 pct greater delivered impact to effect the same flow pattern as compared to steel. This factor greatly influences die life characteristics, accelerating "washout" conditions.

Dies for the forging of titanium and its alloys, require the same general precautions as that

FIG. 9—Typical drop forgings made by Consolidated Industries, Inc. The two small parts and the ring at lower left are outer inlet vane trunnions and a bearing housing respectively. These are jet engine parts forged from RC-70. The top center arm is for a main landing gear actuator forged from RC 130A. The lower right hand part is a lifting lug forged from RC 70. Largest part, the arm, measures 7 in. across.



Titanium forgings tried in jets—

used in sinking dies for forging aluminum. It is highly essential that the final benching be finished by a buffing operation which removes all marks resulting from previous machine work, such as milling, planing, boring, etc. This is important because the presence of any tool marks will carry through in the finished forging, since these materials do not scale as with steel. Subsequent cleaning operations will not eradicate these indications as they do in the case of steel forgings.

Titanium shrinks less

Another factor in the sinking of dies for titanium and its alloys, is that of shrinkage. Generally, it is the practice to sink steel dies allowing for a shrinkage of 0.187 in. per ft, whereas for titanium the shrinkage amounts to only 0.100 in. per ft. This factor, too, must be considered in the case of designing dies for large sections, since existing dies used for forging steel cannot be used unless dimensional discrepancies resulting from shrinkage differentials are within design limits for the specific applications.

High quality surface on titanium bar stock is a must. In upset operations, for example, the presence of longitudinal defects such as seams, or heavy guide scratches, will act as stress risers, even at forging temperatures, and will result as initiating points for open ruptures. Seam depths of as slight as 0.0015 in depth have resulted in scrapped forgings with an upset ratio of less than 2 to 1 based on cross-section.

Five step cleaning method

The method which Steel Improvement has established for controlling this condition is: hot acid pickle cut multiples prior to any forging run. They are currently using an acid solution consisting of 40 pct hydrochloric, 10 pct nitric with the balance water. While this mixture is far from adequate for stock exposed to temperature, it does bring out any surface imperfections on the rough turned and centerless ground material.

The usual procedure for successfully removing the oxide from the surface of forgings is: (1) shot blast, (2) immerse in 60 pct caustic for 10 min, (3) rinse, (4) immerse in 8 pct nitric-2 pct hydrofluoric solution for 15 min, (5) rinse and scrub. These conditions of time can vary with the nature and severity of the oxide layer.

The heating of titanium for forging poses no special difficulty. Heating can be done successfully in an open gas fired furnace of conventional design, or in an electric furnace with a gas curtain. In cases a slightly oxidizing atmosphere gave the best results. The temperatures generally employed range from 1650° to 1800°F, al-

though some forgers limit their working range from 1650° to 1750°F, depending on the severity of the forging operation. Others hot work over the whole wide working range, 1800° to 1400°F, although prolonged heating above 1700°F limits the amount of effective flow below 1500°F.

In special cases using light blows forging is continued down to as low as 800°F to straighten, obtain closer tolerances or to impart higher mechanical properties to the forging. Generally below 1300°F the metal resists impact of the hammer due to higher compressive strength with lower temperatures. Hot hardness of titanium

TABLE XV

HOT HARDNESS OF TITANIUM

Temperature °F	Hardness, Rockwell "A"			
	RC 55	RC 70	RC 130A	RC 130B
80	60	61	69	68
300	52.5	58.5	66.5	66.5
400	47	51	62.5	63
500	41	47	59.5	61
600	35.5	42	57.5	59
700	32.5	36	55.5	56.5
800	30.5	32.5	52	52.5
900	26.5	30.5	50	49
1000	21	26.5	44.5	40
1100	8.5	17.5	34.5	27
1200	Off Scale	Off Scale	20.5	5
1300	Off Scale	Off Scale	Off Scale	Off Scale
80*	60	61	69	68

* Note—All grades returned to original hardness.

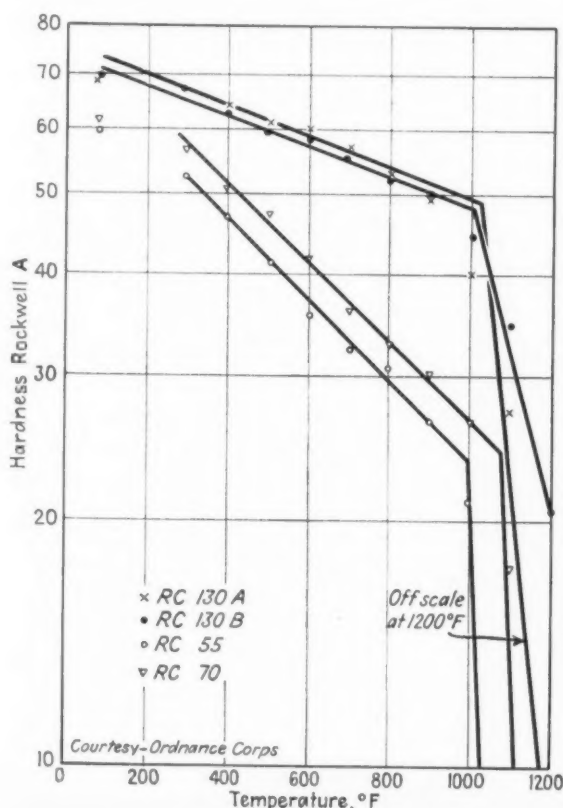


Fig. 10—Semi-log plot of hot hardness of 4 types of titanium. Research was done by P. R. Mallory Co. on an Ordnance Corps. research project.

and hot compressive or tensile strength have not yet been correlated. Fig. 10 is the result of a hot hardness survey on 4 types of titanium run at P. R. Mallory & Co. for Ordnance Corps. These data summarized in Table XV show that the metal must be under 1300°F to even register on the Rockwell A scale.

A Rockwell hardness tester was modified to permit elevated hardness measurements under argon atmosphere. Each hardness valve represents the average of two tests run on separate samples from the same bar. Research on all other alloys is continuing under sponsorship of Ordnance Corps.

The heat treatment given the forgings prior to shipment in most cases is generally specified by the customer and normally consists of either (1) a stress-relief anneal treatment-heating for 1/2 hr at 1300°F and air cooling or (2) heating to 1650°F for 1 hr followed by an air cool. Normally alloys of the high carbon type are furnace tooled from the annealing temperature.

Special annealing treatment used

At times some difficulty in meeting hardness requirements of certain forgings, in spite of various types of heat treatment. In one run of forgings a study was made by Steel Improvement & Forge Co. of incoming bar stock which was furnished annealed. These studies revealed that the hardness of the incoming material and that of the annealed forging were identical, both of which were considerably over specification. Experimentation was conducted on the basis of data obtained from certain West Coast fabricators which resulted in a material reduction in hardness. This treatment involved prolonged soaking at 850°F followed by a water quench and then reheating to 1180°F for 2 hr and air cooling. Ordinarily annealing alloy titanium forgings only softens the parts by about 7 points RC.

Another problem which confronts the commercial forger in the fabrication of these forgings such as compressor blades is that of a straightening; particularly where small quantity lots are involved. Shock straightening, such as hand straightening, or press straightening, frequently results in breakage. To overcome this, if a job is such that trim pads cannot be used, heating in the range of 400° to 600°F greatly facilitates the straightening operation and eliminates breakage, when done hot. This same practice is followed if excessive conditioning is necessary between operations. In most cases, however, grinding can be done at room temperature, providing that the forgings are given an immediate stress-relief anneal at 1300°F.

Most of the titanium forgings produced to date have been for jet engine application. The early sad experiences, see Westinghouse Engineer, July 1952, p. 120, are not indicative of

TABLE XVI

JET ENGINE PARTS FOR J-73 ENGINE*

Part	Alloy	Top Operating Temp.	Prime Metallurgical Requirement
Forged wheels	RC 130B Ti 150A	600°F	Low creep rate
Forged casings last 4 or 5 stages only	RC 130B	500°F	High yield strength
Forged bearing housings	RC 70 or equivalent	700°F	No special requirement
Forged blades, stator, rotor	RC 70 or Ti 100A Ti 150A or RC 130B	700°F	15 pct min. elongation in 2 in. High fatigue properties
Spacer rings flash welded	Ti 150A	700°F	120,000 psi min yield 7 pct min elong. in 2 in. across weld

* Total of 350 to 400 lbs of titanium per engine.

present conditions but the hard fact remains that no jet engine parts of titanium are actually flying or are in daily use. Engines containing titanium parts are still on the test cells on the ground.

General Electric Co. was one of the early companies which investigated and tested jet engine parts. This company's major titanium requirements for their J73 engine is shown in Table XVI, listed in order of weight saving importance.

Using the strength levels of commercial alloys such as Ti-150A and RC-130B GE has designed wheels capable of saving many pounds per engine. Ductility is a highly important requirement for rotating parts. Bursting tests run by GE on dimensionally identical disks have shown a broad range of speeds for bursting. This has been accounted for largely by differences in ductility. Unless a highly stressed part can locally readjust itself by plastic deformation, stresses rise locally to the fracture level at bearing points and section changes.

Alloy segregation cuts ductility

The ductility found in a wheel forging is a result of both composition and history of the metal. Composition affects ductility more through variations within an alloy than through contrast between alloys. The heating and working schedules during forging also affect ductility. For instance, the Cr-Fe-Ti alloys exhibit a grain boundary brittleness after heating above 1650°F. The large grains resulting from high heating appear to be ductile, but the fractures are nearly 100 pct intergranular. A constituent is evidently ejected by the beta grains to the boundary region where it causes brittleness. Brittleness from heating to the all beta region is the usual case. Minor variations, probably in composition, have occasionally permitted heating to the all beta range without embrittlement. If a large forging reduction is made while the alloy is cooling down to the alpha-beta range, the beta boundaries are broken up

Ductile forgings important—

and ductility is restored to the finished forging even if heated above 1900°F.

Aircraft quality in titanium products is essential to successful applications. In the case of disk forgings the billets must be clean inside and outside. Discontinuities such as tungsten or graphite inclusions or segregations from incomplete fusion of alloy additions can dangerously lower ductility in local regions.

A disk forging which has been produced with a good surface, well filled contours, and adequate properties is still no good if there are internal discontinuities. Aircraft quality by magnaflex testing methods cannot be used on titanium. Surface inspections by Zyglo and similar methods can be employed. Sonic testing and x-ray can be used to check internal soundness but as yet no industry standard quality tests have been written for aircraft parts.

Practical fabrication of wheels from forgings will depend on machining techniques. Rough machining would be greatly aided by a method of removing the forging surface before actual machining was started. The case hardened layer below the forging scale probably causes more grief to machinists than any other single factor. General Electric has found that in turning, machining costs of titanium are only 1½ times more than that of regular alloy steels.

Welded casings not yet approved

Another interesting application of titanium forgings in jet engines is their possible use in compressor castings. Toward the hotter end of the compressor aluminum cast alloys creep rather badly under operating stresses. Rather than using steel for such a large heavy part GE is making an effort to use titanium. Several designs calling for forming and welding have been suggested. They believe that welded designs will have to stay on the shelf until weldable alloys appear. Meanwhile, they are making casings by contour forging plates of titanium alloy and machining the desired contours. Other parts not for jet engines are in the same experimental status by other companies, see Fig. 11.

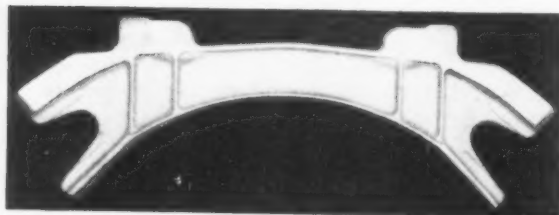


FIG. 11—An experimental forging for Lockheed made by Transue and Williams. This part is 32 in. long x 8 in. wide forged from MST 3 Al, 5 Cr, titanium alloy.

Ductility is important in casing parts as there are many stress raisers in the vicinity of the joining flanges. Surface quality is important since the outer surface is stretched during forming and the inner surface must clean up without too much waste of material to accurate dimensions. The machining of the casing is a terrific job. Contour forging of the outside of the casing will make the fabrication more practical. The cost of using casing of titanium at present is much too high.

Jet engines require blade forgings to be at least somewhat ductile in all directions. Because of changes in directionality within the material during forgings, ductile titanium alloy bars can make very brittle blades. The blades in most cases are of cantilever design. Consequently, vibration and shock loading are of primary concern. General Electric tests every blade they make for ductility and are constantly trying to arrive at bar acceptance tests which can be met by the suppliers and which will assure us of ductile blades. So far they have never made a brittle blade from bar which was below Rc-36. But hardness is not well correlated with ductility as at Rc-39 some blades are very brittle while others have more than adequate ductility.

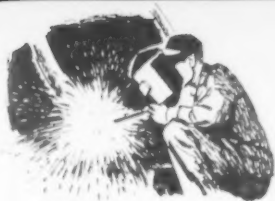
Blade finish highly important

Other requirements of forged titanium blades are needed to assure their successful application. The blades must be near perfect in dimensions and finish. No folds or other surface imperfections are allowed. Finishing marks are removed to eliminate sources for fatigue failures.

Titanium compressor blades appear desirable largely from weight-saving standpoint. While each blade weighs only a few ounces, there are nearly 2,000 blades per engine. It appears that there is sufficient difference in stress levels for stator blades as compared to rotor blades that the two may be made from different titanium alloys. The stator blades have air loading and vibrational stresses but no centrifugal loading; consequently, it may be quite feasible to use a lower alloy such as Rc-70 or Ti-100A. The lower alloy is apparently more ductile and should eliminate the chance of producing brittle blades.

The cost of titanium blades is not so far out of line as the larger forgings for wheels and casings. Forging operations on the blades are so many that material becomes a smaller fraction of the total cost.

At General Electric every steel part is under consideration for titanium substitution where temperature permits. Already being developed are shaft couplings, accessory drive gears and bearing housings. Each can be machined from titanium of sufficient size, but each can probably benefit from forging. More efficient utilization of material can be realized as well as mechanical property benefits from proper grain flow.



Welding Titanium

Weldability of titanium, just as in other metals, is a relative term. Generally unalloyed titanium is entirely weldable with resulting good ductility and strength. The alloys weld equally well but are brittle. As yet no heat treatment, prior or post heating methods have been developed to remedy this embrittlement. Most metallurgists and welding engineers don't believe that the present alpha-beta alloy will ever produce ductile welds and new alloys hold the only hope of overcoming this problem. Some operating and fabricating experts don't agree.

There are those in the aircraft companies who believe that weldability has been overstressed. They point out the 75-St aluminum is not exactly a readily weldable material but is used in tonnage both in the welded and in otherwise fastened type of assemblies. They imply that if the purists can be sidetracked long enough for the fabricators to work out their techniques that the present poor reputation of welded titanium might be salvaged.

Hold O₂, N₂ and H₂ to 0.20 max. total

The three impurities in titanium responsible for embrittlement can usually be tolerated in welding if the sum of the oxygen, carbon and nitrogen do not exceed 0.20 pct. For good ductility the maximum of each single element is 0.15 pct O₂, 0.05 pct N₂ and 0.15 pct C. Usually any unalloyed titanium meeting these conditions of purity can be satisfactorily welded as long as the welding operation doesn't increase the contamination. Although the same contamination requirements hold for the alloys they are of lesser importance. The only reason they are of lesser importance is that no matter how high the purity, brittle welds still occur in alloys and are due to the decomposition of the unstable beta phase.

In fusion welding great care must be taken to protect the weld from contamination by air. In these cases most of the trouble encountered in welding, i.e., contaminated and therefore brittle welds in unalloyed titanium, are due to mechanical maladjustments rather than problems any more difficult than encountered with good welding techniques for aluminum or stainless. In the case of spot or flash welding no problem of protection of the weld area exists.

Rohr Aircraft Corp. has done considerable work on welding and their preliminary conclusions on fusion welding are: "The problems encountered in fusion welding of unalloyed titanium are very similar to those of stainless steel." The major difference is tighter controls

on all variables when welding titanium. The proper mating of the butted edges and the surface preparation are more critical. The maximum gap between the two sheets when butted together should not exceed 8 pct of the material thickness. The inert atmosphere must give more protection of the fused zone for a longer period of time than when welding stainless.

A typical example of the test settings used by Rohr on DC 300 amp welders for titanium 75A, .025 in. thick was: a mixture of 7 liters of helium, 14 liters of argon—7 liters pressure on the top and 15 from the back. This material was welded at 23 ipm and 20 amps of current. The back-up bar has a "V" shaped slot approximately 1½ in. wide at the top. The gas enters through holes, at the vortex of the slot, which are 1/16 in. apart. This back-up bar is the only component of the machine that had to be changed for the purpose of welding titanium. The original bar did not have as deep or as wide a slot and shielded the weld in spots only. Past practice on machine welding has been to control the penetration by the speed of travel and it was found necessary to weld about ½ as fast when welding titanium as when welding stainless. From the first this company has been successful in obtaining a weld bead having excellent appearance. However, they feel that Ti-75 and Rc-70 can be welded with improved ductility of the weld and weld area as tensile tests on the weld metal show elongation of only 12 to 16 pct. Bend tests showed a bend of 180° with a 2T radii on .025 in. samples.

Fig. 12 shows the bottom of the all welded 81 mm mortar base plate. All welds are fusion

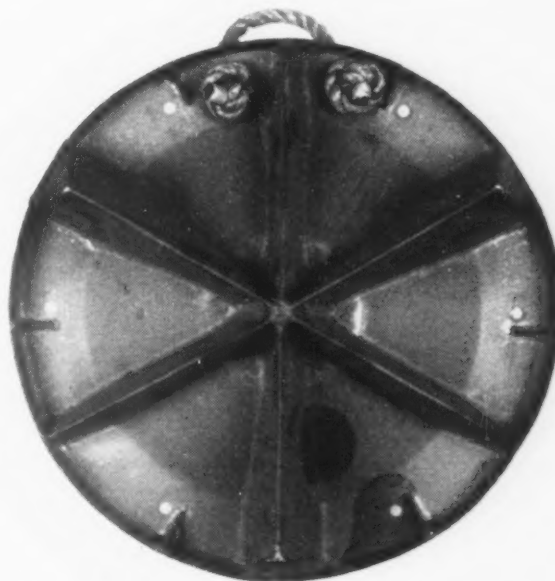


FIG 12—Bottom of the all welded 81 mm mortar base plate. All welding was done with regular argon shielded, tungsten electrode gun. Filler rod was made from RC 70 sheet sheared into strips. Sound ductile welds were obtained with no special precautions.

Pure titanium welds well—

welds done with a regular Heliarc tungsten electrode welding gun using argon to shield the arc zone. The base plate is made of RC-70 0.100 in. thick and the filler rod material is made by shearing into the strips some of the same stock used to make the plate. The welders at the Arsenal report no difficulties of any type in welding and tests show all welds of high quality and good ductility.

No ductile alloy welds produced

Fusion welding of the titanium alloys have not produced ductile welds to date by any process except flash welding. The problem here is a metallurgical one rather than mechanical. Until all alpha type of alloys are available it is not believed that the present limits of 5 pct max. elongation in the weld or heat affected zone of the alpha plus beta alloys will be improved.

Resistance spot welding of unalloyed titanium has shown good results. Basically titanium lends itself to this method because of its low thermal conductivity and low coefficient of expansion. Strength of spot welded joints are not affected greatly by the oxide coating which forms on the metal at room temperature. Hot formed scale, however, must be removed. Sodium hydride cleaning followed by water washing and then a bright dip in 10 pct HNO_3 1/4 pct HF

and pickle in 10 pct HNO_3 —2 pct HF is recommended by some producers on any stock which is to be welded by fusion or spot methods.

Practices for cleaning varies with each shop. Rohr Aircraft for instance, measures surface cleanliness with a micro-ohmmeter which they have used for years to measure the surface cleanliness of aluminum prior to spot welding. Others merely give the metal a good cleaning and weld it immediately without further checks. North American Aviation, one of the largest aircraft users of titanium to date, has been running welding tests under Navy contract and on their own. Fig. 13 indicates the spot welding characteristics of RC-70 annealed sheets as found by North American. Fig. 14 sums up their recommendation for AC machine settings for spot welding RC-70 sheet.

Same shear values as stainless

Although there is no good agreement in the industry on the precise value of tension or shear tests, these tests are being made on spot welded titanium samples. In cases, shear values on unalloyed titanium are about equal to those obtained on 1/4 hard stainless. In other cases, the results vary widely due to conditions of test, weld penetration, diameter of button, etc.

Generally, the ratio of tensile to shear strength of titanium both that of commercially pure and alloy is lower than that of spot welded 75-ST or 18-8 stainless. Ratios of tensile to shear strength for Al and stainless range from 30 to 80 pct. In unalloyed spot welded titanium this value has ranged from 20 to 40 pct. In spot

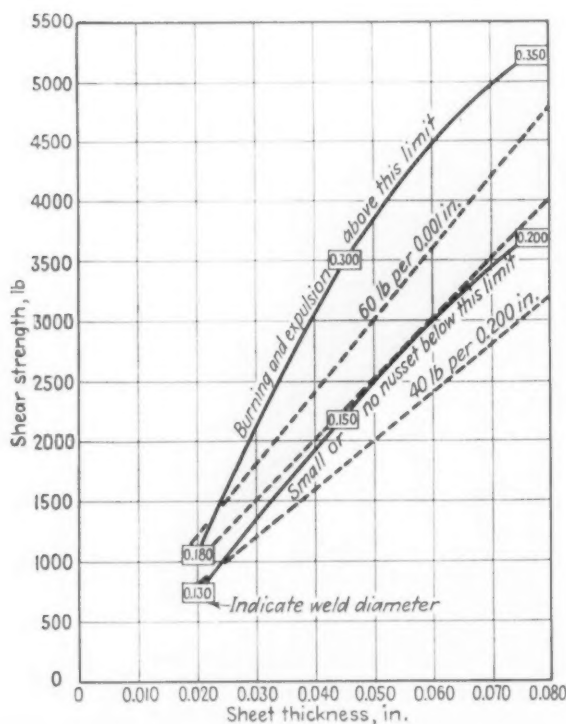


FIG. 13—Spot welding characteristics of RC 70 annealed sheets as found by North American Aviation Co. Work was done under Navy Bureau of Air contract.

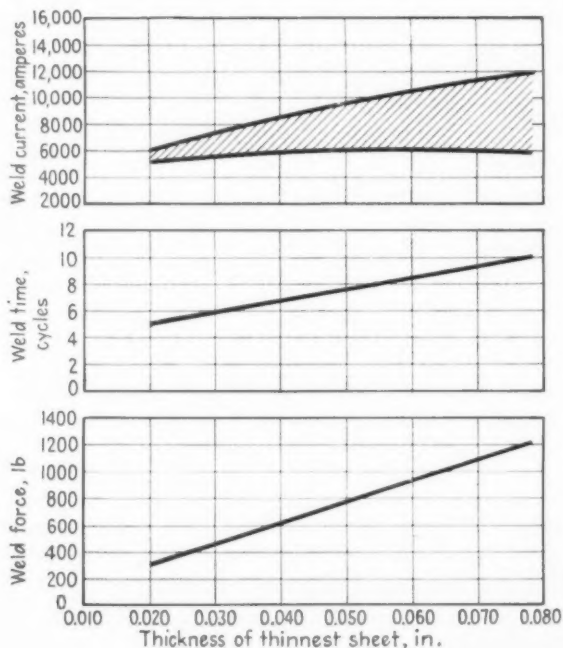


FIG. 14—Spot welding settings for AC machines for RC 70 annealed sheet. Courtesy North American Aviation and U. S. Navy.

welded alloys the range drops to ratios of 10 to 15 pct and here again it is a case of unstable beta phase characteristics of the alloys rather than a case of welding techniques.

One of the spot welded assemblies just being put on a production basis is shown in Fig. 15. Exhaust shrouds for the helicopter engine are made from Ti-75A. Severe forming and many spot welded fittings are involved in this part which will insulate the plane from the heat of the exhaust system serving the buried engine in the Hub-1 helicopter.

Welding embrittlement in spot welded alloys occurs in two regions. One area is in the heat affected zone; the other is in the cast metal nugget itself. Ductility can sometimes be restored to the heat affected zone of alpha-beta alloys by reheating to around 1100°F and slow cooling to room temperature. This treatment, however, does not restore ductility to the cast metal of the weld and freezing is too fast to slow down the decomposition of beta or stop alloy segregation during the weld operation itself.

Flash welding holds ductility

Flash welding has produced the ductile welds made in alloy titanium to date. In this process the molten metal does not end up in the joint and the only area of embrittlement possible is the heat affected zone. Sound welds of good ductility have been produced by the American Welding & Mfg. Co. by flash welding in both unalloyed and titanium alloys. As in spot welding no protective atmosphere is required. Early in 1949 this company successfully flash welded ½ in. diam rods of unalloyed titanium. All welds were sound and ductile.

The introduction of the higher strength alloys such as RC-130B and Ti-150A presented a problem not normally encountered in flash welding other ferrous and nonferrous materials. This was the apparent sensitivity of titanium to crack in areas of surface or structural discontinuities. Bars which had surface defects removed by grinding just prior to shipment from the mill cracked when the bars were clamped in the welding machine. One lot, which had been checked for hardness at the mill, fractured through the Brinell impressions.

If fracture did not occur at these points immediately upon clamping the cracks appeared



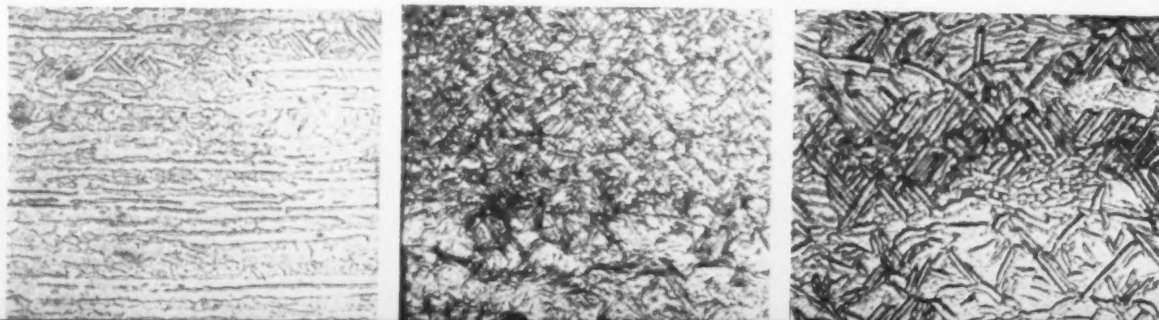
FIG. 15—Ryan Aeronautical Co. employee adjusts a Ti 75A shroud over the exhaust system used by Piasecki Helicopter. Spot welded assembly of severely formed titanium parts operates at 500°F.

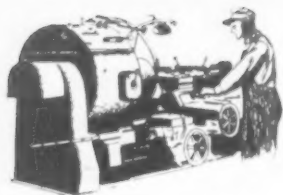
sometime after the weld was completed. The additional stresses set up by the thermal gradient during the welding cycle apparently are sufficient to cause failure. When bars were annealed at the mill after surface preparation, no trouble was encountered. It was found that a rough chip or grand mark resulting from burr removal of the welded bars could give rise to cracks, but cracking could be avoided by getting the welded rings into a furnace at 1300°F for 15 min immediately after welding, followed by an air cool.

A typical weld cycle for 2 x 5/16 in. bars of RC-130B flash welded into a ring consumes 8 sec with the voltage (open circuit) at 6.2. Flashing travel was ¾ in., upset travel ⅜ in. and final die opening is usually 1⅛ in. That cycle produced welds of 152,000 T.S., 146,500 yield, and 15 pct elongation in 2 in. with a reduction in area of 46 pct.

With flash welding no cleaning of the ends to be joined is necessary. Rough rather than smooth ends are preferred as the arc is more easily established with rough mating surfaces. The rough current at around 10,000 amps flashes away the two mating surfaces and in effect electrically machines and cleans the edges to be joined. No trace of a molten constituent is found in the flash welded joints, see Fig. 16.

FIG. 16—Micrographs of flash butt welded Ti 150A made by American Welding and Manufacturing Co. All samples were etched with 2 pct HF50 pct HNO₃ rinse, mag is 500x. Weld zone is in center of the middle photo. Annealing temperature was 1300°F. Left to right: Parent metal, as welded, and welded and annealed.





How to machine titanium

Machining has been mentioned in former parts of this article as it is common to the manufacture of parts made by all processes. Many difficulties have been experienced in machining titanium for the reason that the metal is unique in physical characteristics and the industry had no previous experience. Many of the initial problems have been solved but titanium is still a special animal that requires different machining techniques.

The major causes of titanium's poor machinability are (1) smearing and galling which causes metal buildup on the tools (2) work hardening which can dull the tools and (3) abrasive action of hard titanium carbide on the cutting edge of the tool. All these factors are related so that the only good approach is to tool up to prevent any of the above troubles. Fig. 17 illustrates the effect of carbon on tool life of a K-8 tipped tool.

Titanium in which the carbon content is below 0.20 pct will not generally contain enough hard carbides to dull the tools if super hard alloy or carbide tools are used. Because the metal has low thermal conductivity more than ordinary cooling of the tool and the workpiece must be provided.

Carbon dioxide has been reported to vastly improve the machinability of both alloyed and unalloyed titanium.⁵ The recommended type of tools for major machining operations as well as feeds and speeds are shown in Table XVII.

Major factors to insure optimum machinabil-

ity are: (1) plan parts so that there is as little metals removal as possible, as titanium costs money and chips can't usually be sold. (2) use sharp carbide or carbide tipped tools whenever possible. (3) take as heavy cuts as machine and part will permit. (4) hold work rigidly, support firmly. (5) direct coolant at high pressure to the cutting edge of tool. (6) use adequate cutting edge to avoid side drag. (7) use chip breakers when turning and drilling.

TABLE XVIII

RECOMMENDED GRINDING ABRASIVES

Grinding Operation	Carborundum Company	Norton Company
Rough Grinding, Snagging	C3A203-N-B5	A14-Q4B7 32A46-G12VBEP
Intermediate Grinding	A303-O-B5	
Cylindrical Grinding	*A465-K6-V11 †A80-K6-V11	32A80-J8VBE
Finish Surface Grinding	DA46-K9-V20	32A46-I8VBE

* Work diameter 1½" and larger.

† Work diameter under 1½".

Satisfactory abrasives for grinding have been developed for particular grinding operations, see Table XVIII. Generally wheel speeds of 2000 to 3000 sfpm and table speeds of 400 to 500 ipm are recommended. Feeds should be about 0.001 in. per pass and proper coolants are important. With low wheel speeds oil coolants are satisfactory as not enough sparking is involved to fire the oil. At high speed particularly on rough

TABLE XVII

RECOMMENDED MACHINING METHODS

TOOLS	FEED ipm	SPEED sfm	REMARKS
Turning			
Material carbide, cast iron or super hard grades	0.015 to 0.018	90 to 110	1/8 to 1/2-in. depth of cut, high C, Ti
Side rake 3 to 7	(roughing)	150 to 170	low C, Ti
Back rake 0°			
Side cutting edge angle 0°	0.0006 to 0.008	100 to 120	0.030 to 0.060-in. depth of cut
End cutting edge angle 6°	(finishing)		
Relief 6°			
Radius 0.030 in.			
Drilling			
Material cobalt high speed steel	0.008 to 0.020	12 to 15	For drills up to 1/4-in. diam.
Point angle 118°			
Clearance 12 to 15° on 28° spiral			
Reaming			
Material carbide tips	0.005 to 0.008	100 to 200	0.012 to 0.030-in. depth of cut on the diameter
Flutes 4			
Back taper 0.0002 in. per in. flute length	Up to 0.020		On large diameters
Primary clearance angle 10 to 15°			
Chamfer angle 45°			
Tapping			
Type Interrupted 3-flute, spiral point tap, high speed steel		12 to 15	
Milling			
Material 18-4-1 high speed steel	0.003 to 0.005 in.	32 to 45	High speed cutters
Rake 10°	per tooth	65	Carbide cutters

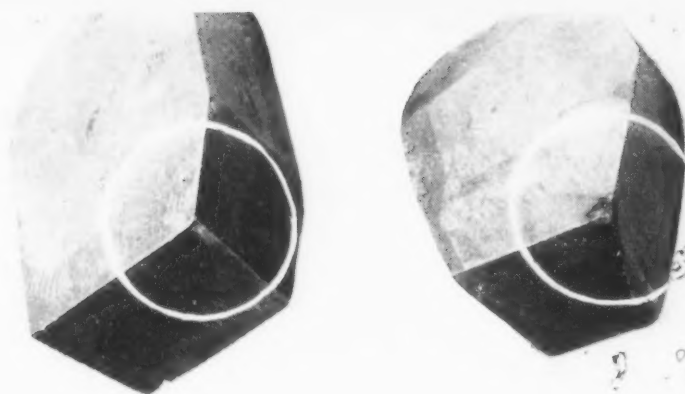


FIG. 17—Effect of carbon content of Fe-Cr alloy on tool life of K-8 carbide tips. Tool on left removed 470 sq in. of the low carbon alloy, micro at left. Tip on the right shows micro of high carbon alloy and condition of tool edge after removing but 25 sq in. of metal. Tests were run at 150 sfpm, 0.0035 ipr feed and 0.015 in. depth of cut. Courtesy Westinghouse Electric Corp.

grinding oils should not be used. One company found quite by accident that a regular rust inhibitor used full strength or diluted with water served as an excellent coolant for rough grinding.

Sulfurized cutting oils are generally used with satisfactory results for turning, drilling, tapping, milling and broaching. In the case of cobalt bonded carbide tools, these oils may cause pitting, however, in which case water soluble oils or other coolants should be used. CO₂ coolant has given excellent results in broaching and turning operations and are recommended for these operations where possible.

One interesting fact regarding machining of forgings is that grinding and drilling cost often soar out of sight when the as received forging is harder than Rc-36. Most titanium forgings are delivered at hardness between Rc-30 to 40. So far, best machinability of such parts has been found between Rc-30 to 36.

Part II, covering melting, casting, sponge making and raw materials will appear in next week's issue of The Iron Age.

REFERENCES

- ¹ A. N. Eshman, "Titanium Sheetmetal Parts Successfully Made," *The Iron Age*, July 17, 1952, p. 132.
- ² J. L. Everhart, "Titanium and Its Alloys," *Materials and Methods*, May, 1952.
- ³ O. A. Wheelon, "Formability of Titanium Investigated," *The Iron Age*, Dec. 13, 1951, p. 140.
- ⁴ H. H. Hanick, "Titanium Aircraft Engine Parts: An Analysis," *The Iron Age*, May 15, 1952, p. 121.
- ⁵ D. C. Goldberg & W. S. Hazelton, "How to Machine Titanium," *The Iron Age*, April 17, 1952, p. 107.

SELECTED BIBLIOGRAPHY*

- | | |
|---|--|
| Campbell, I. E.
Jaffee, R. I. | "Titanium—Its Prospects . . . Its Properties." <i>The Iron Age</i> , July 28, 1949, pp. 48-51. |
| Cross, H. C. | "Titanium—The Metal with a Future." <i>Engineering and Mining Journal</i> , July, 1949, Vol. 150, No. 7, pp. 119-123. |
| Ralston, O. C. | "Titanium—Metal of the Future." <i>Metals Transactions</i> , Aug., 1949, Vol. 20, No. 2, pp. 11-12. |
| Aust, K. T.
Pidgeon, L. M. | "Solubility of Titanium in Liquid Magnesium." <i>Metals Transactions</i> , Sept., 1949, Vol. 185, pp. 585-587. |
| Spence, N. S. | "Titanium—Fact Versus Fancy." <i>Modern Metals</i> , Sept., 1949, pp. 15-17. |
| Derge, Gerhard | "Oxygen in Titanium." <i>Journal of Metals</i> , Oct. 1949, Vol. 1, No. 10, pp. 31-33. |
| Frazier, L. B. | "Forging and Welding Titanium." <i>The Iron Age</i> , Jan. 19, 1950, p. 63. |
| Barth, W. J.
and others | "Effect of Carbon in Ti Metal Ingots." <i>Industrial and Engineering Chem.</i> , Feb. 1950, Vol. 42, No. 2, pp. 243-249. |
| Cservenyak, F. J.
Ralston, O. C. | "Potential Uses of Titanium Metal." <i>Industrial and Engineering Chem.</i> , Feb. 1950, Vol. 42, No. 2, pp. 214-217. |
| Winter, C. H., Jr.
and others | "Recent Developments in Titanium." <i>Journal of Electrochemical Soc.</i> , Feb. 1950, Vol. 97, No. 2, pp. 49-53. |
| Ellis, O. W.
and others | "A Study of Some Alloys of Titanium." <i>The Canadian Mining and Met.</i> , Feb. 1950, Vol. 43, No. 454, pp. 74-87. |
| Gonser, Bruce | "Titanium Alloys." <i>Industrial and Engineering Chem.</i> , Feb. 1950, Vol. 42, No. 2, pp. 222-226. |
| Bounds, A. M. | "And Now—Titanium Tubing." <i>The Iron Age</i> , Apr. 6, 1950, p. 85. |
| Pittler, R. K.
Jaffe, L. D. | "Toughness of Titanium." <i>Metal Progress</i> , June, 1950, Vol. 57, No. 6, pp. 776-778. |
| Anthony, J. | "Alloys Widen Use of Titanium." <i>The Iron Age</i> , July 27, 1950, p. 60. |
| Brown, D. I. | "Two New Titanium Alloys Now In Production." <i>The Iron Age</i> , Sept. 14, 1950, p. 85. |
| Maykuth, D. J.
Ogden, H. R.
Jaffee, R. I.
Manchester, H. | "Alloys of Titanium with Carbon, Oxygen and Nitrogen." <i>Journal of Metals</i> , Oct. 1950, Vol. 188, pp. 1261-1266. |
| Brown, D. I. | "Titanium: Our Next Major Metal?" <i>Popular Science</i> , Oct. 1950, pp. 148-151. |
| Finlay, W. L. | "Wanted: Huge Titanium Expansion." <i>The Iron Age</i> , Nov. 30, 1950, p. 87. |
| Pittler, R. K.
Jaffee, L. D. | "Effects of Three Interstitial Solutes (Nitrogen, Oxygen and Carbon) on the Mechanical Properties of High-Purity Alpha Titanium." <i>Journal of Metals, Transactions AIME</i> , Nov., 1950, Vol. 188, p. 1396. |
| Williams, W. Lee | "Production of Titanium From TiCl ₄ in an Arc Furnace." <i>Journal of Metals, Transactions AIME</i> , Nov., 1950, Vol. 188, p. 1396. |
| Brown, D. I. | "How Titanium Behaves At Temperatures To 900°F." <i>The Iron Age</i> , June 14, 1951, p. 81. |
| Morton, P. H.
Baldwin, W. M. | "More Titanium Oxide Now Available." <i>The Iron Age</i> , Nov. 1, 1951, p. 119, Part I. <i>The Iron Age</i> , Nov. 8, 1951, p. 129, Part II. |
| | "How Does Titanium Scale At High Temperatures?" <i>The Iron Age</i> , May 1, 1952, p. 133. |

*Comprehensive bibliography available on request.

Molybdenum

With a siliconized coating it stands up under 3200°F, shows promise for use in jet engine and electrical applications.

Uses: While this report deals with molybdenum as a pure metal or alloying base, it must be remembered that the current uses of the metal, as such, represent only a small fraction of the total production. Nearly 90 pct of the 32 million lb of molybdenum products shipped annually is consumed by the steel and iron industry as ferroalloy. The remaining 10 pct is divided among the electrical, chemical, and ceramic industries.

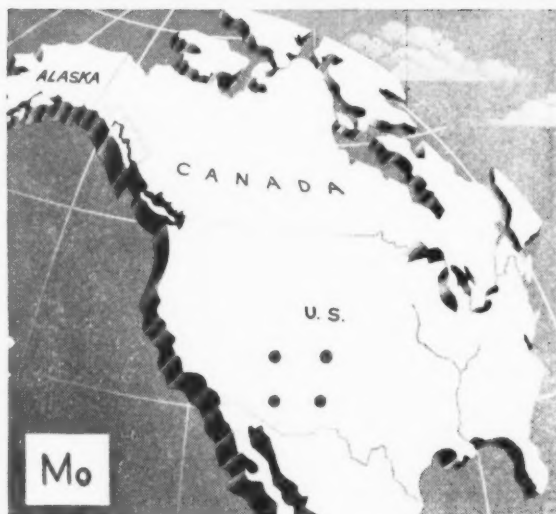
Molybdenum can be formed by rolling, swaging, forging, drawing, bending, stamping, machining, brazing, and welding. Such basic forms as wire, rod, sheet, plate, bar, seamless tubing, and sintered shapes are available. At present, much of the wire is consumed in the electrical and electronics industry to make heaters for furnaces and supports for vacuum tube components. Sheet is used to make plates and grids for vacuum tubes, radiation shields, and furnace "boats." Seamless tubing is used in the chemical industry. Molybdenum rod finds application where glass-to-metal seals are needed and is also made into resistance-welding electrodes and heavy duty contact breakers.

Commercially produced alloys include those with tungsten and with nickel, as well as powder-metallurgy compositions containing silver, copper, or graphite.

Outlook: Experimental developments, directed toward protection of molybdenum from oxidation, have made high-temperature applications in air feasible. With siliconized coatings the metal may be heated for extended periods to as high as 3200°F. Using nickel or inconel cladding and suitable edge protection, wrought forms may be used in air to 1800-2000°F. As a result of these developments, applications of molybdenum are being extended into the jet engine field with promising result.¹ Further research may yield even better protective methods, which will extend the useful range of molybdenum to higher temperatures.

Welding is a problem with molybdenum. Special apparatus and controlled atmosphere are necessary to obtain good welds. Even so, good room-temperature ductility is not obtained. Welded molybdenum can be formed, however, when heated to redness.

Studies of molybdenum-base alloys have shown them to be superior to the pure metal. The ele-



Principal U. S. Raw Material Sources.

ments aluminum, chromium, columbium, silicon, titanium, tungsten, and vanadium are effective additions. These elements improve the strength of molybdenum at both room and elevated temperatures. The useful high-temperature properties of molybdenum become apparent in tests conducted about 1600°F. Properly protected from oxidation, molybdenum and its alloys are superior to other wrought materials above this temperature. Use of Mo-V alloys in aircraft is increasing.

Availability: Molybdenum can be had commercially in nearly any desired form. Through newly developed methods of pressing and sintering, bars weighing up to 500 lb have been made. The new method of arc casting has been able to produce ingots weighing up to 1000 lb. Accurate figures of metallic molybdenum production are not available. It is estimated that the production would be from 200,000 to 400,000 lb annually.

Molybdenum concentrates mined in the U. S. will provide about 38 million pounds of molybdenum in 1952. This amount will continue to increase and should rise to 51 to 56 million pounds in 1953. Imports amount to about one-half per cent of the total, but are exceeded by exports.

As of 1944, about 90 pct of the known commercial reserves remained. Based on the 1935-39 average production rate (22,000,000 lb), this would last for 420 years. At the current (1952) rate of about 36,000,000 pounds, the expectancy

FACTS ABOUT MOLYBDENUM

Discovered	1781
First prepared in ductile form	1910
Density	10.2
Melting Point, deg. F.	4760
Tensile strength, wrought	85-100,000 psi
Tensile elongation	30-20 pct per in.
Oxidation resistance	forms volatile trioxide above 930° F
Corrosion resistance	HF, HCl

would be about 260 years. Future discovery of new sources, plus extraction of submarginal ores, could add another 60 to 300 years to this figure.

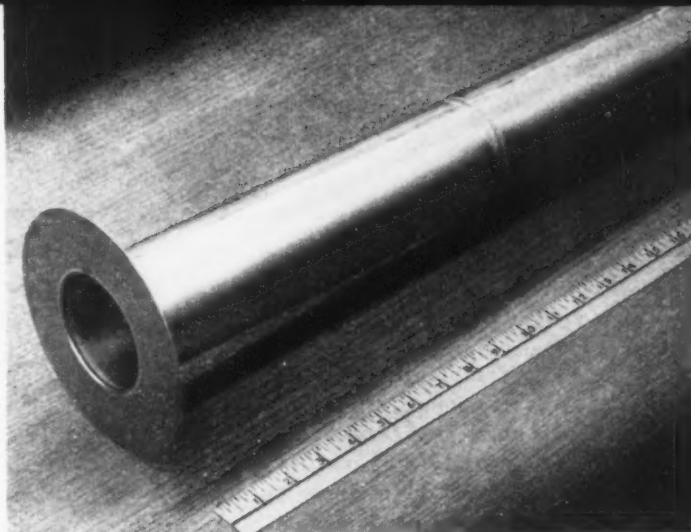
Supply vs. demand: The demand for molybdenum, especially as the ferroalloy, exceeds production. This is a natural result of the stepped-up production of steels and cast irons for military use. In addition, the expanding role of molybdenum as a basic ingredient in high-temperature alloys is increasing the demand. It is expected that sizeable quantities of the metal and its alloys will be needed in jet and rocket manufacture, and that non-military consumption will be restricted for some time to come.



MESH woven from 0.002-in. molybdenum wire, product of Fansteel Metallurgical Corp. This mesh is used in a special type of electronic tube.

Price and suppliers: The arc-cast product and wrought shapes are obtainable from Climax Molybdenum Corp., New York. Sintered bar and wrought shapes are available at Fansteel Metallurgical Corp., North Chicago, Illinois and from Westinghouse Electric Corp., Bloomfield, New Jersey, and East Pittsburgh, Pa. It is understood, also, that General Electric Corp. can supply powder and wire.

Price is governed by shape and supplier. In general, powder can be obtained for \$3 to \$12.50 per lb; ingots for about \$10 per lb; wire from \$7.50 to \$15 per lb; seamless tubing, sold by the inch, costs up to \$6 per inch for 1/2-in. O.D., 0.09-in. wall; and other wrought shapes up to \$60 per lb.



WELDED molybdenum tube, flanged at one end, closed at the other, used in reaction with iodide vapors at high temperatures. Molybdenum is the only commercially available metal that will withstand this corrosive condition. Photo courtesy Fansteel Metallurgical Corp.

Source: The principal minerals containing molybdenum are molybdenite (MoS_2) and wulfenite (PbMoO_4); molybdenite being the more important. The largest commercial source of molybdenite is at Climax, Colo., where about 50 pct of the U. S. supply is mined. Molybdenite also occurs in copper ores, where it is recovered as a by-product. Much of the molybdenite is derived this way at Bingham, Utah; Miami, Ariz.; and Chino, N. M. Wulfenite, containing 39.3 pct MoO_3 , is produced in Questa, N. M., and Knaben, Norway.

I. W. M. Boam, "Jet Engines Push Welded Molybdenum Study" THE IRON AGE, July 10, 1952, p. 145.

EXPERIMENTAL molybdenum furnace at Battelle Memorial Institute. Molybdenum bars have been made in weights up to 500 lb, ingots weighing 1000 lb have been cast.

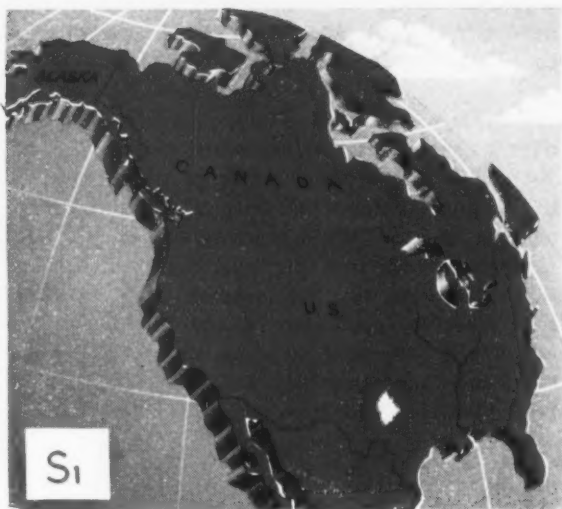


Silicon

Coated on other metals, silicon improves their resistance to acid attack and oxidation . . . Supply is no problem.

Present uses: Silicon is used almost entirely as an alloy. Ferrosilicon containing 50 pct silicon is much used for deoxidizing killed and semikilled steel; the 75 pct grade is used mostly in grey iron foundries, high silicon spring steel and for production of electrical quality sheets. The commercially pure metal, alone or as master alloys, is used in nonferrous alloying. Effective use of silicon (or ferrosilicon) as a reducing medium is exemplified by the production of low carbon ferrochromium by silicon reduction of chrome ore, and production of magnesium by silicon reduction of magnesium oxide. Silicon metal, 97 pct Si, is used for the production of silicones.

Outlook: Since brittleness limits use of the massive metal, at least some of silicon's advantages in resistance to oxidation and acid resistance can be utilized by coating it upon formed base metals. Fortunately, many metals can be coated, since volatilized silicon tetrachloride is readily reduced on many metal surfaces by replacement or by reduction in a hydrogen atmosphere. Siliconized steel could replace high alloy steels and castings for some applications under corrosive or high temperature conditions where the parts need not have high impact strength.



Principal U. S. Raw Material Sources.

Siliconized molybdenum gives a particularly effective oxidation resistant surface. Such a coated product, or one modified by other additions may replace platinum and molybdenum furnace windings, and find numerous applications at temperatures up to 3800°F.

With its lightness, availability, and excellent resistance to oxidation and to acids, silicon would be one of our most important structural materials if it had ductility. Attempts to make ductile silicon, both here and abroad, have failed so far. It is inherently brittle, and its atomic structure would have to be modified to achieve ductility. Some slight evidence has been reported of a form of silicon other than cubic (diamond) existing above 700°C, and slight deformation of 99.8



SILICONIZED rod, tubes and structural iron are test pieces designed to show how materials can be coated fairly easily. It gives them excellent resistance to acids and oxidation. Siliconized steel could replace high alloy steels and castings in some applications.

FACTS ABOUT SILICON

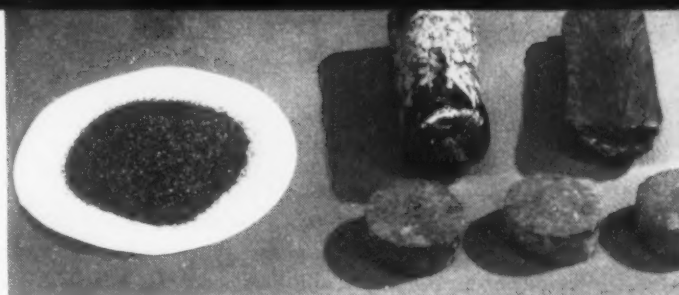
Discovered	.....1823
First prepared in pure form	.....about 1918
Density	.....2.3-2.4
Melting point, deg. F	.....2600
Mechanical properties	.....brittle, unworkable
Corrosion resistance	.....excellent against acids
Oxidation resistance	.....excellent, even at high temperatures.

pet silicon has been reported at this temperature, but so far this hope for ductility has not materialized practically.

Silicon is a good semiconductor; that is, it has some unusual electrical characteristics like germanium, selenium, and tellurium, whereby, depending on purity, it may be useful in constructing rectifiers, transistors, and various devices of utmost interest in the electronics field.

The fastest growing use for the pure metal is in the production of silicones. Silicones have opened up a new industrial chemical field potentially as broad as that of organic chemistry. New production capacity is being built to supply the silicone market but could be used to supply the demand for metal if and when it arrives.

Figured on a volume basis, silicon is one of the cheapest of the metals. Note that it is somewhat lighter than aluminum. It deserves more attention that it has received in the past.



SILICON powder and silicon ingot shown in longitudinal section and cross section. Bell Telephone Laboratories, which made this photo, has been studying silicon and other semi-conductors for many years.

Supply vs demand: Plentiful supply. Demand for the commercially pure metal is still very light.

Price and suppliers: Silicon metal, 97 pct grade, is currently 20 to 25¢ per lb. The 99.7 pct grade (chemically purified) is about \$18 to \$20 per lb. Extremely high purity silicon is available on special request, and prices are quoted individually. The main suppliers are Electro Metallurgical Co., a division Union Carbide and Carbon Co., New York, and Vanadium Corp. of America, New York.

Source: Everywhere, U. S. A. It is the most abundant metal in the earth's crust.

Selenium

With electronic applications growing, the problem is to produce more of this scarce metal, perhaps from plants.

Present Uses: The glass industry has been a large user because of the ability of selenium to decolorize or neutralize normally greenish tint from iron contamination; hence it produces a clear, white glass. Of large and rapidly growing importance is the varied field of usefulness of selenium in the electronics field. In rectifiers to convert alternating to direct current and in photosensitive devices, selenium and its compounds find widespread use in the radio-television industry and elsewhere.

Metallurgically, selenium is of minor importance as its properties make it unsuitable for use as the massive metal and general alloying. However, small amounts added to some metals, particularly stainless steel and copper or copper alloys, aid machinability. As a protective coating, the only notable example has been the use (particularly in Europe) of a thin surfacing of

selenium on magnesium to reduce the attack of sea water or salt spray.

Outlook: Applications, particularly in electronics, are constantly increasing and the problem is to get more metal. Many old as well as new uses are dormant or curtailed because of limited supply or present high cost.

Availability: Selenium stocks are at their lowest level in years; price has gone up sharply. Total production in the U. S. and Canada is approximately 1 million lb per year, with no significant increase in prospect unless new sources are developed. Possible sources of increased supply include: (1) Recovery of selenium from copper ore now smelted but not electrolytically refined; (2) better recovery in plants now producing selenium where only about one-third of the selenium in copper ore may be eventually recovered; (3) recovery from the sulfur pro-

FACTS ABOUT SELENIUM

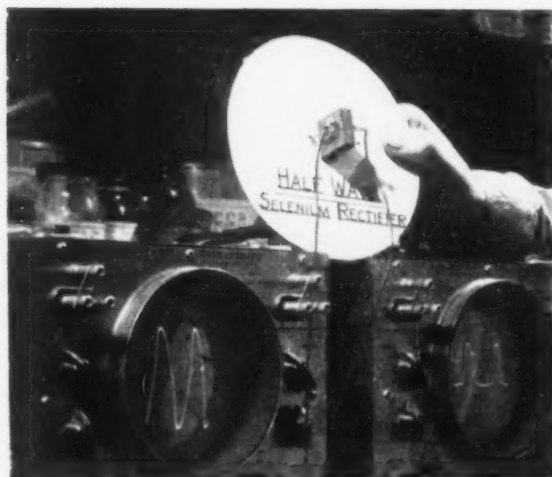
Discovered	.....1817
First commercial use	.....about 1905
Density	.....4.8
Melting point, deg. F	.....430
Mechanical properties	.....brittle, unsuited for structural purposes.
Electrical properties	.....good semiconductor, photo-sensitive.
Corrosion and oxidation resistance	.....not outstanding

Selenium (continued)

duced in the roasting of pyrites (one company could recover 40,000 lb per year from such a product) if a way could be found to do it; (4) exploitation of some minor deposits that contain selenium but are not now mined; and (5) by growing selenium in certain seleniferous soils, particularly in the Dakotas. Selenium accumulator plants of the pea family are known, and others may be developed. These plants have been known to contain up to 1.5 pct selenium.



FARMING for selenium is a possibility. Plants like this *Astragalus Racemosus* (which is commonly called vetch) contain selenium. In certain areas, the plant could yield many pounds of the metal per acre. Photo courtesy South Dakota Experiment Station.

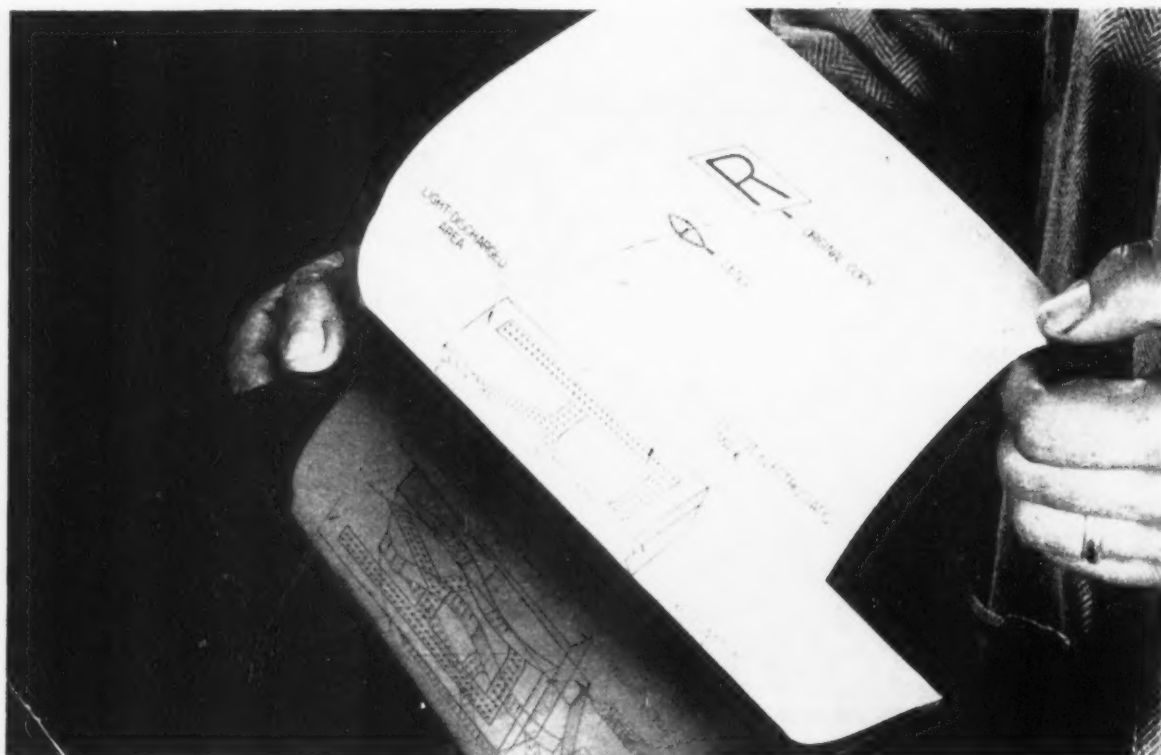


SELENIUM demand tops supply by some 200 pct because of fast growing new uses, like this experimental half wave rectifier developed by Battelle engineers.

Supply vs. Demand: Demand tops supply by at least 200 pct.

Price and Suppliers: Present price is \$3.50 per lb and up, depending on purity. Suppliers include: American Smelting & Refining Co., American Metal Co., Anaconda Copper Co., and Canadian Copper Refiners, Ltd.

Source: At present the sources are the slimes from electrolytic copper refineries and some secondary metal recovered from selenium rectifier scrap.



XEROGRAPHY (zee-rog-ra fee) is a direct positive printing process which reproduces by direct contact in one operation. A thin layer of photoconductive selenium powder takes the place of a silver emulsion. This photo, made during work at Battelle, shows one step in the process, transfer of image from plate to paper.

Vanadium

Its electrical characteristics may open new fields . . . Corrosion resistance and spring behavior suggest other new uses.

Present Uses: Ferrovanadium, containing 30 to 55 pct vanadium, comprises about 90 pct of current consumption. It is used in alloy and tool steels. The use of metallic vanadium, alone, at present is limited largely to alloying with gold in dental alloys, copper and bronzes (such as for aircraft propeller bushings), and with aluminum for airframe construction. It serves as a strengthening and stiffening agent in these alloys.

Pure vanadium can be formed quite easily into rod, sheet, or foil. Its susceptibility to contamination from oxygen, hydrogen, and nitrogen, requires that hot fabrication be performed in a protective atmosphere, or by enveloping the metal in a sheath. It can be machined, stamped, pressed, ground, extruded, rolled or forged and welded in an argon atmosphere using the Heliarc process. Pure vanadium is used by A.E.C. but further information in such applications is classified.

Outlook: The outstanding characteristics of vanadium are its combination of resistance to marine-atmosphere corrosion and its high modulus-density ratio (3.7 million). The pure metal may find applications where spring behavior and corrosion resistance are desired. New applications for vanadium will have to overcome two drawbacks, its high cost and its poor oxidation resistance at high temperatures.

One use which is apparently developing for vanadium is as an alloy with titanium and molybdenum. In the case of titanium, vanadium has the property of stabilizing the beta phase, thus tending to produce an improved alloy for structural use.

Vanadium has some electrical characteristics which may open new fields. It has been found useful as a filament wire in vacuum tubes due to its high temperature strength characteristics, and it demonstrates a good thermo-electric po-



Principal U. S. Raw Material Sources.

tential with platinum. It also has some unusual electrical-resistance, temperature characteristics.

Availability: Ductile vanadium is now available. A major producer has stated that about 100 lb a day can be furnished on reasonable notice. Production facilities could be increased rather rapidly, if necessary.

Supply vs demand: The vanadium situation is good. Should the need rise, the output of vanadium could be stepped up strongly. Even during World War II, vanadium was not put on price control.

Price and suppliers: Ductile vanadium remelt stock is available at about \$30 per lb, and less in comparatively large amounts. Semifinished plate, $\frac{3}{8}$ x 3 x 10 in., cost about \$60 per lb. High purity powder is currently available at \$1.50 per gram. Ferrovanadium sells for about \$3.00 per lb of contained vanadium. Among suppliers of common forms of the ductile metal is Electro Metallurgical Co., a division of Union Carbide & Carbon Corp.; or high purity powder is Westinghouse Electric Corp. (Lamp Div.); and of vanadium alloys and crude metal is Vanadium Corp. of America.

Source: Vanadium-bearing ores occur mainly in the western United States, the Peruvian Andes and in northern Rhodesia and Southwest Africa. The metal is relatively more abundant than copper or tin in the earth's crust, and about the same in abundance as zinc and nickel. In recent years, about three-fourths of the vanadium used by the United States has come from the Colorado Plateau region. Carnotite and roscoelite, the two most frequently encountered ores, occur in low-grade deposits (from 1 to 2 pct vanadium). In addition, vanadium occurs in complex ores in both western and eastern United States. Vanadium is imported largely as concentrates and the pentoxide from Peru, and as flue dust from Curacao, Netherlands West Indies.

FACTS ABOUT VANADIUM

Discovered	1830
First prepared in ductile form	1927
Density	6.0
Melting point, deg. F	3100
Tensile strength, wrought	31,000 to 155,000 psi
Tensile elongation	17 to 1 pct per inch
Modulus of elasticity	21,000,000 psi
Oxidation resistance	Excellent up to a few hundred degrees F; must be protected from nitride, oxide, and hydride formation at elevated temperatures.
Corrosion resistance	good in salt spray, sea water, aqueous alkalis, dilute HCl.

Zirconium

Potential uses include metal-to-glass seals, corrosion resistant jobs . . . AEC is now almost the sole zirconium user.

Present uses: The chief use of zirconium now is as a material of construction for nuclear-reactor power plants. This is easily understood, since it has good-enough mechanical properties, excellent corrosion resistance, and a very low thermal neutron absorption cross-section (i.e., permeability to slow neutrons). The ability of zirconium to pass through slow neutrons (and thus conserve them for their primary function of maintaining a chain reaction) is exceeded for the metals only by bismuth, lead, and beryllium. The structural performance by these is vastly inferior to zirconium.

The uses of ductile, metallic zirconium in non-nuclear applications are less important tonnage-wise. These uses are based for the most part on zirconium's excellent corrosion resistance. The resistance to HCl is exceptionally outstanding, and is exceeded only by the precious metals and tantalum. Thus, uses in handling HCl where good heat transfer is required, such as in condensers, boilers, etc., are clearly a field of application. Zirconium is also very good in resisting alkali corrosion, but so are silver and nickel, and it is doubtful if many applications in this field will develop.

A long-time use which consumes a relatively small amount of zirconium is as a getter in electronic tubes. Besides cleaning up residual gases, zirconium can be used as a structural member, thus serving a twofold purpose. Zirconium has potential uses in metal-to-glass seals as a result of its low linear coefficient of thermal expansion, and in electrolytic condensers.

Outlook: Expanded utilization of zirconium in nuclear energy applications is a certainty. The Carborundum Metals Co., Inc., Akron, New York, has been formed recently to produce 150,000 lb of zirconium sponge per year for the AEC. Foote Mineral Co. and the Bureau of Mines at Albany, Oregon, also are zirconium producers. Together with expanded production and lower price, nonnuclear consumption of zirconium should be appreciable. The main outlet will be in corrosion-resistance applications.

Availability: The total production of ductile zirconium is classified information, since nuclear energy requirements are involved. This causes



Principal U. S. Raw Material Sources.

some uncertainty in the amount of zirconium that can be released to nonnuclear uses. Availability might be best stated this way: Sufficient ductile zirconium is available to take care of anticipated demand at the present high price.

Supply and demand: The U. S. Atomic Energy Commission has priority on all present production.

Price and suppliers: The price of the metal depends to a considerable extent on the form in which it is furnished. Foote Mineral Co. sells iodide or crystal-bar grade zirconium in as-deposited form for about \$65 per lb. The base prices for fabricated forms are \$200 per kilo (\$91 per lb) for swaged rod, \$289 per kilo (\$131 per lb) for sheet, and \$327 per kilo for wire. Prices for smaller sizes than the base are generally higher. TAM's base price for the zirconium sponge and briquettes is \$10 per lb. For fabricated forms the base prices are reported to be \$27 per lb for sheared plate (3/16 to 3/4 in.) and hot-rolled round or square bar (1/4 to 3 in.), \$28 per pound for hot-rolled strip (0.09-0.1871 in. by 10 in. maximum with 12-ft maximum length), \$35 per lb for cold-rolled strip, and \$32.50 for wire. Finer gauges are higher priced.

The only "open market" domestic producers of

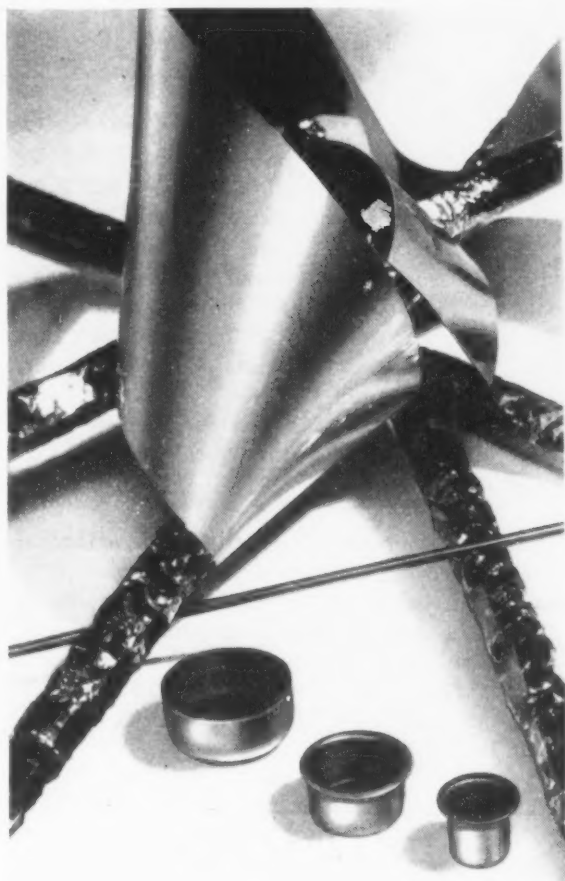
FACTS ABOUT ZIRCONIUM

Discovered	1789
First prepared in ductile form	1925
Density	6.5
Melting point, deg. F.	3325
Corrosion resistance	HCl, NaOH
Crystal Bar	
Tensile strength, psi	30-40,000
0.2% offset yield, psi	35-45
Reduction in area, %	15-20,000
Elongation %	25-35
Modulus of elasticity	13 x 10

ductile zirconium at the present time are the Foote Mineral Company for crystal-bar grade and the Titanium Alloy Mfg. Div., National Lead Co. for sponge-grade zirconium. Murex, Ltd., a British concern, also produces ingots and fabricated forms from sponge zirconium.

Source: The chief zirconium mineral is zircon (zirconium silicate), which comes from beach-sand deposits. Almost half of the U. S. consumption comes from Florida beach sands. Imports of zircon are from Travancore, India, and Australia. The availability of zircon appears excellent. Heavy imports are the result of excellence and cheapness of foreign ores, rather than a limited domestic supply. Baddeleyite, a zirconium dioxide ore, comes from Brazil and is less important industrially.

Extraction: Two chief processes: the Kroll process of magnesium reduction of the tetrachloride, and the deBoer process of thermal dissociation of the iodide. Much less important for the extraction of ductile metal is calcium hydride reduction of the oxide. In current prac-



IODIDE ZIRCONIUM crystal bars and fabricated material, products of Foote Mineral Co., show excellent ductility of metal now widely used by Atomic Energy Commission because of good nuclear cross section.



NUCLEAR REACTORS are principal users of zirconium today because it passes through slow neutrons, thus conserving them for their primary function of maintaining a chain reaction. Photo at Foote Mineral Co. plant shows engineer holding a zirconium crystal bar. Background shows iodide deposition units.

tice, Kroll is the primary extraction method. If further purity, with associated higher ductility and better corrosion resistance, is desired, the Kroll metal is refined by converting to the iodide and then to the metal in the deBoer process. Oxygen and nitrogen are eliminated by the deBoer process. DeBoer can be used as a primary process, too, if the starting material can be iodinated, such as zirconium carbide.

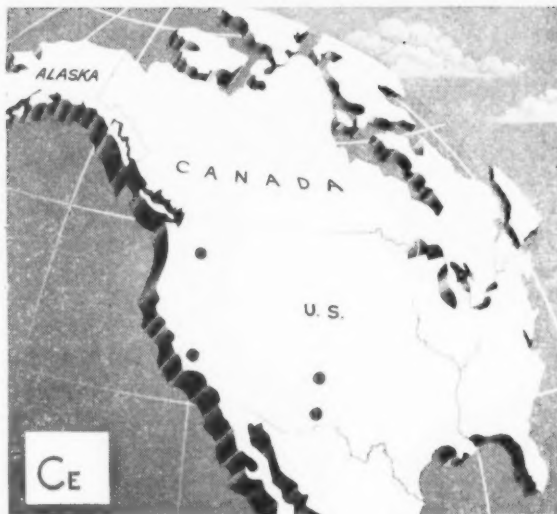
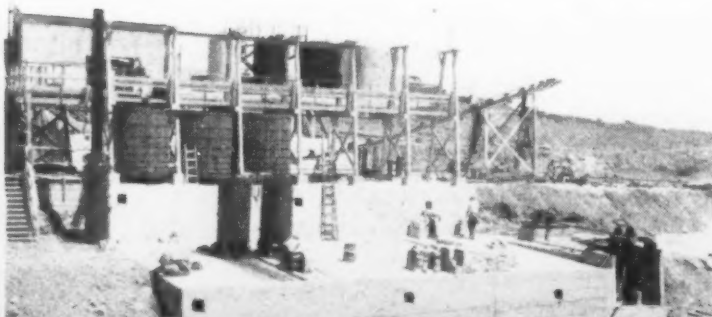
Cerium

Research shows good possibilities for alloying cerium with the light metals . . . Its use in steelmaking is also promising.

Present uses: There are virtually no uses for pure cerium metal, since the difficulty in isolating the metal, plus the lack of information as to its properties, has handicapped its development. Principal current uses are: (1) As a decolorizer in the glass industry; (2) used with titanium to produce a yellow color in glassware; (3) as an oxide, as an abrasive in glass polishing; (4) as an oxide, cerium is used as an opacifier in certain types of porcelain enamel; (5) for lighter flints, principally as ferrocerium (a mixture of rare earths and iron); (6) as a part of a rare-earth mixture in cores of carbons for high-intensity carbon arc lamps; and (7) most recent use, still in development stage, is additions in steel manufacture. Stainless, tool steel, alloy steel, and electrical-grade steels appear to show beneficial results after additions of lanthanum-cerium-didymium group compounds. Rare-earth additions in the ladle apparently have some desulphurizing effects. "Cerium" additions to cast iron also effect fluidity and hot workability, and resistance to oxidation in certain applications.

Outlook: The interest and support of research in techniques for isolation of rare metals by the AEC has greatly increased the knowledge in this field of metallurgy. By-product production of cerium from monazite will probably increase the available supply. The newly-discovered bastnasite locality, while presenting difficult recovery problems, definitely places cerium in better future supply. Alloying research shows numerous possible applications with the light metals and other nonferrous metals, as well as in steel metallurgy. As soon as more pure metal becomes available, new uses should follow for cerium and other members of the rare earths.

RECENT FIND in California is expected to change the cerium supply picture. Photo shows partly completed chemical plant at Mt. Pass mine of Molybdenum Corp. of America, at Nipton, Calif. Mine is now milling 100 tons per day of ore containing 10 pct rare earth oxides. Plant should be completed this month.



Principal U. S. Raw Material Sources.

Availability: It should be remembered that cerium is more abundant in the earth's crust than such "common" elements as antimony, bismuth, cadmium, mercury, tin, and tungsten. The term, "rare earth," is of historical significance in that the pure metals were difficult to produce in the pure state. The current supply situation does not justify its literal translation.

Supply vs demand: Current supplies are rather tight, but adequate. Indications of increasing supply are strong.

Price and suppliers: 90-98 pct grade, \$12 per lb; low-iron misch metal, \$4.50 per lb. Rare Earths, Inc., Paterson, N. J.; Lindsay Light & Chemical Co., West Chicago, Ill.; Cooper Metallurgical Associates, Cleveland; Research Chemicals, Inc., Burbank, Calif.; The Maywood Chemical Works, Maywood, N. J.; Cerium Metals, Inc., New York; General Cerium Co., Edgewater, N. J.; New Process Company, Newark, N. J.; Molybdenum Corporation of America, New York, N. Y.; and American Metallurgical Products Co., Pittsburgh.

Source: At present, monazite is the principal source of cerium. However, the discovery of a very large deposit of bastnasite, a rare-earth mineral (a fluorocarbonate of cerium, lanthanum, and other rare earths), in San Bernardino County, Calif., in April, 1949, will probably change the supply picture. Such deposits are also found in New Mexico.

FACTS ABOUT CERIUM

Discovered	1801
Density	6.9
Melting point, deg. F (approx)	1190
Mechanical properties	Soft (42 brinell), ductile
Oxidation resistance	Powder is xyrophoric; massive metal tarnishes in moist air, ignites at 265°F.
Corrosion resistance	Good in sodium hydroxide and in concentrated sulfuric acid.

Note: Cerium is closely associated with other metals of the rare earth family and the term "cerium" is frequently applied to mixtures in which cerium is the dominant element.

Germanium

Miniature radio receivers making use of germanium transistors may have indefinite life, use far less power than tubes.

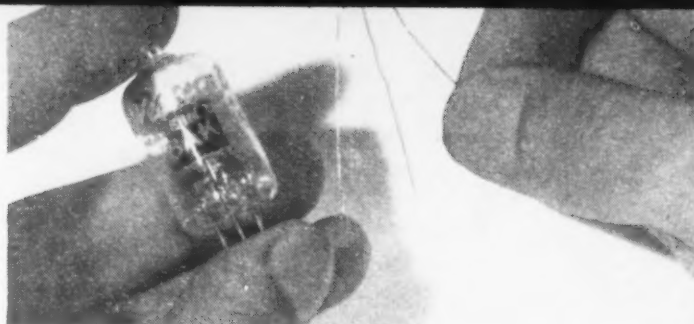
FACTS ABOUT GERMANIUM

Discovered	1886
First prepared commercially in the U.S.A.	1942
Density	5.36
Melting point, deg. F.	1725
Mechanical properties	brittle, unworkable
Electrical properties	semiconductor, resistivity increases with purity
Corrosion resistance	Resists strong alkalis, dilute sulfuric and concentrated hydrochloric acids.
Oxidation resistance	good for temperatures up to 1100° F; forms volatile oxide at 1300° F in air.

Present uses: Practically all current production is going into the electronics field where the excellent semiconductor properties of germanium make it invaluable for use as a crystal rectifier or diode for high frequencies, as a transistor or triode to replace the normal function of the vacuum tube, and other devices. With germanium it is possible to make miniature or compact radio receiving sets, for instance, and to get indefinite life with far less energy consumption than when using vacuum tubes. Also, since germanium is transparent to infrared radiation, it can be used in infrared spectroscopy or any optical instruments adapted to use infrared "light."

Outlook: Aside from the very strong and growing demand for germanium in electronics applications, it has properties that could be used in other fields. Germanium glass has an unusually high index of refraction which may make it useful for special applications, as lenses, if the cost does not remain too high. Photo-conductive properties and a very high thermoelectric power may lead to applications.

Metallurgically, the potential use of germanium is limited since brittleness precludes structural uses, and in alloying it generally acts like silicon which is much cheaper. One of the most interesting and possibly useful alloys is the 12 pct germanium-gold eutectic alloy which melts at only 673°F and expands slightly on solidifying. This gives sharp castings. It has been used successfully experimentally for dental inlays. Coat-



SPIDERY object at right is a new type transistor, a tiny amplifier invented at Bell Telephone Laboratories. Miniature vacuum tube is shown at left for a size comparison. Transistors have been called the first serious rival of the vacuum tube because they need only about a millionth of the power of a miniature tube and apparently will last indefinitely.

ings of germanium over base metals, glass, or ceramic materials are readily made by heating the part to be coated in gaseous germanium hydride.

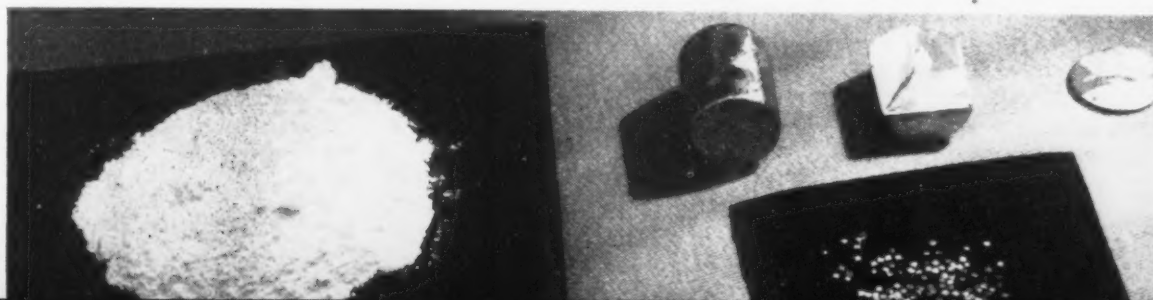
Availability: Need for germanium has stimulated considerable activity both here and abroad in developing new sources. Several zinc companies are now attempting to recover germanium and it is probable that production from this general source may amount to 5000 to 10,000 lb per year within 2 years. Likewise, germanium recovered from Belgian Congo zinc ores may be available soon. A comparatively large supply is expected to develop from southwest Africa (Tsumeb) copper-lead-zinc ores. Recovery of germanium from power plant flue dusts, i.e., volatilized oxide and fine ash in burning coal, is progressing most rapidly in England but not yet on a large scale.

Supply vs demand: The demand currently far outstrips the supply.

Price and suppliers: High purity metal is listed at \$340 per lb in lots of over several pounds. However, germanium is largely sold as the dioxide and is reduced to metal by the user. The high purity oxide sells for \$140 per lb, or slightly over \$200 per lb of metal content. Eagle Picher Co., Cincinnati, is the chief producer.

Source: At present, germanium is recovered as a by-product in treatment of zinc concentrates. Potential sources are from germanite in copper-lead-zinc ores of southwest Africa and flue dusts from burning coal containing germanium.

GERMANIUM materials: Germanium dioxide powder, wafers used as electrical devices and ingot with longitudinal section and cross section shown beside it. Photo by courtesy of Bell Telephone Laboratories.



Lithium

Easily melted, cast, formed and welded, its weight is a third that of magnesium but special surface protection is needed.

Present uses: Principal uses for lithium are for compounds, as lithium greases that have exceptional water resistant properties and give efficient lubrication at temperatures from -60°F to 120°F , as lithium oxide to get low melting ceramics and promote adherence to the iron base, as lithium chloride in some Cathabar air-conditioning units to control humidity. Several lithium compounds, and the metal itself, are being used in organic synthesis work. The hydride has been used as a convenient and concentrated form of hydrogen to inflate antennae balloons.

Metallurgically, lithium is used only to a small extent as a minor alloying element. Thus, addition of about 10 pct lithium to magnesium converts the hexagonal structure to the more ductile cubic form. Such alloys are in the development stage. Addition of 0.04 pct lithium to a lead-base in Bahnmittel, the German lead-base railway bearing metal, gives hardness that is re-



Principal U. S. Raw Material Sources.

protect it against corrosion by moisture or ignition in air above 400°F . Extensive use then depends upon success in research to develop proper cladding or alloying for surface protection. This is a tough problem but not one that is hopeless.

Use of more lithium in alloying with other metals is promising although the relatively high cost at present is a deterrent. Extended applications of lithium compounds are also favorable.

Availability: With the rapid development of lithium deposits at Kings Mountain there should be ample supplies of lithium compounds, and metal, as needed in the near future. The metal price is high since little is consumed at present.

Supply vs demand: Currently the demand for lithium compounds exceeds the supply, but this is believed to be a temporary condition since production facilities are increasing.

Price and suppliers: 98 pct metal, \$8.85 to \$11.00 per lb. (Lithium chloride sells for about \$1.00 per lb in drum lots, equal to \$6.00 per lb of metal content). Suppliers for metal include Maywood Chemical works, Maywood, N. J., and Metalloy Corp., subsidiary of Lithium Corp. of America, Minneapolis, Minnesota. These and Foote Mineral Co., Philadelphia, Pa., are leading suppliers of lithium salts also.

Sources: The principal ore of lithium, spodumene, is mined particularly in the Kings Mountain district in North Carolina and in the Black Hills of South Dakota. Deposits of spodumene in the former district, carrying 6 pct lithium oxide, are just being developed, but reserves are known to be large enough to supply all anticipated needs for many years. In addition, there are large deposits of lithium ores in Canada, and especially in Africa. Searles Lake in California is estimated to contain 100,000 tons of lithium chloride.

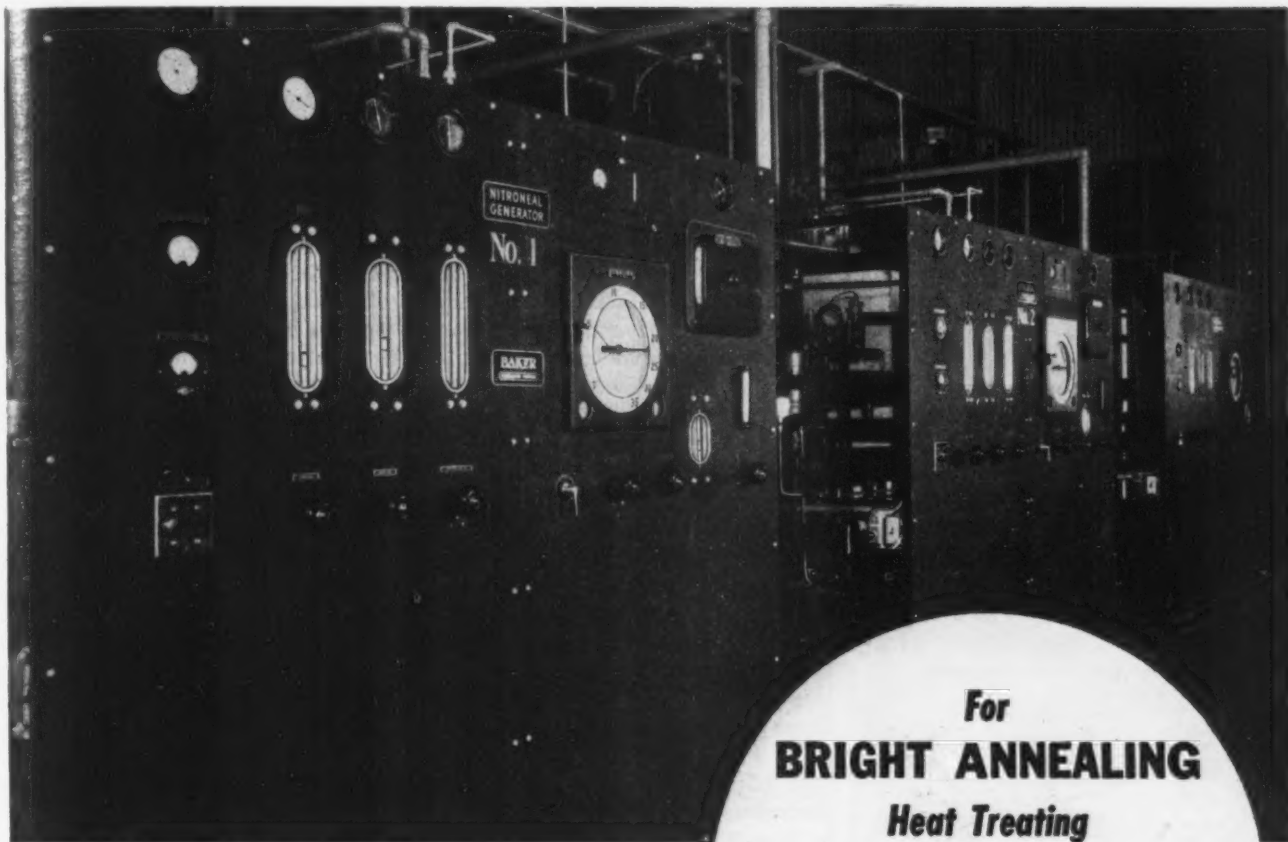
FACTS ABOUT LITHIUM

Discovered	1817
First prepared commercially	about 1924
Density	0.53
Melting point, deg. F	356
Mechanical properties	very soft, ductile, easily extruded and rolled.
Corrosion resistance	poor, reacts with moisture and forms nitride in moist air. Ignites in air at 400°F .
General	lightest of metals, reactive alloys with most metals.

tained at a relatively high temperature. Some aluminum-welding fluxes contain lithium chloride; other welding and brazing fluxes use lithium fluoride. Lithium chloride is also used as a constituent in some low-melting, heat-treating salt baths.

Outlook: Considering metal applications only, the biggest interest in lithium is to utilize its lightness, since its weight is less than a third that of magnesium, and it floats readily on light oils. The metal is easily melted, cast, formed, and welded. By alloying, it very probably could be made to have reasonably good strength with ductility for structural purposes. The difficulty is to

NITRONEAL GAS



Typical Steel Mill Application of Three Model 3000-G Nitroneal Generators

**SEE UNIT ON DISPLAY AT METAL
SHOW PHILADELPHIA, OCT. 20-24**

NITRONEAL GENERATORS

Available in 100 C.F.H. to 10,000 C.F.H. Capacities

Fundamentally new ammonia-air reactor produces pure nitrogen with a controllable hydrogen content that can be varied at will and maintained at any percentage from .25% to 30% as required.

- FULLY AUTOMATIC
- NO OPERATING PERSONNEL REQUIRED
- NO EXPLOSION HAZARD
- 30% LESS COSTLY THAN DISSOCIATED AMMONIA

GAS RATIOS PER 1000 CUBIC FEET OF FINISHED NITRONEAL GAS

% HYDROGEN	.25	1.0	3.0	6.0	20.0	25.0	30.0
AMMONIA (c.f.)	301	304	309.3	316.7	350	370	386
AIR (c.f.)	1070	1064	1033	990	790	715	640

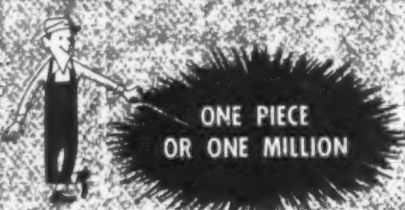
Baker & Co., Inc.

113 ASTOR ST., NEWARK 5, N. J.

October 9, 1952

291

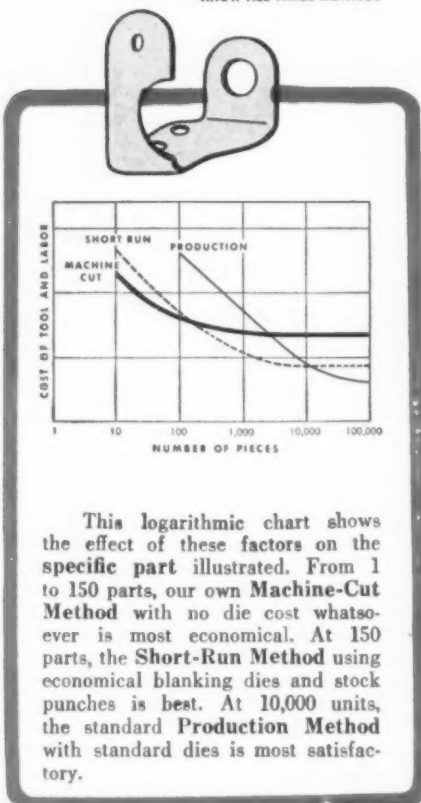
STAMPINGS



Our impartial use of three basic methods gives you economy regardless of length of run.

Most parts can be made by all three methods. But only one is most economical. The right decision is a technical one, based on over-all quantity, contour dimensions, tolerances and materials.

YOUR SUPPLIER SHOULD KNOW ALL THREE METHODS



For more information, use coupon on opposite page

**STAMPINGS
DIVISION**



3210 Union Street, Glenbrook, Conn.

The Road Ahead

The Gargantuan U. S. appetite devours the more common metals and minerals faster each year . . . Our resources are not unlimited . . . How will we meet future demand?

The United States appetite for materials is Gargantuan—and so far, insatiable. At mid-century, over 2½ billion tons of materials are being used up each year to keep the country going and support its high standard of living. With a population of 151 million, each person uses up, on an average, some 18 tons a year. He uses about 14,000 pounds of fuel for heat and energy—warming houses and offices, running automobiles and Diesel trains, firing factory boilers, and hundreds of other tasks. He uses 10,000 pounds of building materials—lumber, stone, sand and gravel, etc.—plus 800 pounds of metals winnowed from 5000 pounds of ores. He eats nearly 1600 pounds of food; this together with cotton and other fibers for clothing, pulpwood for paper and other miscellaneous products mounts up to 5700 pounds of agricultural materials. In addition, he uses 800 pounds of nonmetallics, such as lime, fertilizer, and chemical raw materials.

Such a level of consumption, climaxing 50 years of phenomenal

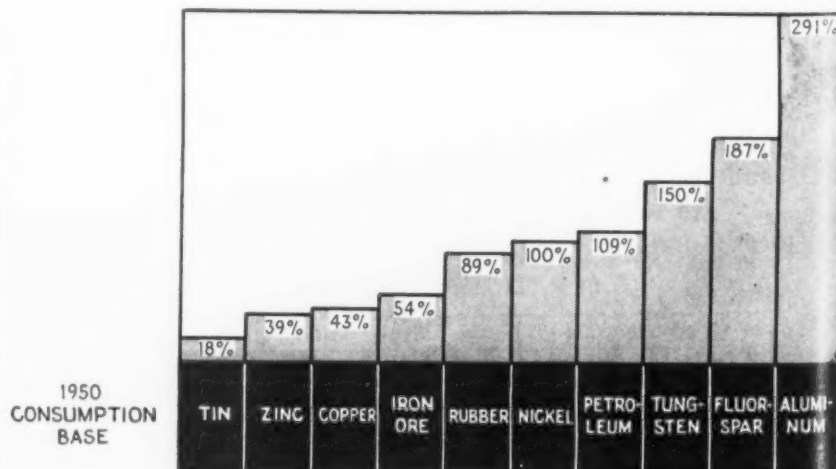
economic progress, has levied a severe drain upon the United States endowment of natural resources. Minerals, forest, soil, and water—all have felt it. A few comparisons between 1950 and 1900 are instructive. In the first 50 years of the twentieth century, United States population doubled. National output in this same time reached five times the 1900 level. The per capita national income for Americans rose from roughly \$325 in 1900, to \$530 in 1925 and \$864 in 1950 (in 1939 dollars).

It took a considerably expanding flow of raw materials to support this growth, but not in the same high proportion. The value of the materials stream* (in constant dollars) rose only half as much as the

* Here defined to include all mineral products except gold, plus agricultural, forest, fishery, and wildlife products consumed in the United States. All statistical statements in these chapters exclude gold. See vol. II, Production and Consumption Measures.

national output; services were beginning to become a larger proportion of the goods and services that made up this output, and more

Materials Demand Will Rise Unevenly



DEMAND projected by the President's Materials Policy Commission for the period 1970-1980. Black area at bottom is 1950 consumption base.

mon
s are

ted a
States
ources.
ater—
risons
struc-
of the
States
l out-
d five
capita
s rose
o \$530
a 1939

anding
support
same
of the
nt dol-
as the

products
ery, and
d States,
pters ex-
consump-

ere be-
proport-
es that
more

only

291%

ALUMI-
NUM

period

AGE

value was being added to materials by successively higher fabrication as time went on. It was for such reasons as these that relatively smaller materials values could sustain the more rapidly growing total output.

Even more striking than the increase in the total size of this stream were the shifts in its composition. Our total consumption of agricultural products of all sorts, including food, increased $2\frac{1}{4}$ times; fishery and wildlife products rose little more, and our total use of forest products actually declined 1 pct. But our consumption of minerals, including fuels, rose to six times 1900 totals. By 1950—in comparison with the year 1900—we were taking from the earth:

Two and one-half times more bituminous coal.

Three times more copper.

Three and one-half times more iron ore.

Four times more zinc.

Twenty-six times more natural gas.

Thirty times more crude oil.

Indeed, there is scarcely a metal or a mineral fuel of which the quantity used in the United States since the outbreak of the First World War did not exceed the total used throughout the world in all the centuries preceding.

The minerals increase is compounded partly out of the needs that rise with growing populations, partly out of a per capita consumption which has increased threefold

This article is abstracted from "Resources for Freedom," a Report to the President by the President's Materials Policy Commission, Vol. I, U. S. Govt. Printing Office, June, 1952.

in the same time, and is still growing. Fundamentally it reflects the increasing mechanization of modern society. As a result of the turret lathe and tractor, the automobile and airplane, the submarine and tank, the electric washing machine and vacuum cleaner, we have been

We used four times more zinc, three and a half times more iron ore . . . increased mechanization reflected.

Turn Page

SHIMS

BRING YOUR SHIM PROBLEMS
TO "SHIM HEADQUARTERS"

THE
LAMINUM®
SHIM



ONLY LAMINATED SHIM COMPANY
OFFERS YOU ALL FIVE SOLUTIONS:

SIMPLY PEELS FOR ADJUSTMENT

Made up of from 3 to 63 layers of .002 or .003 inch brass or steel, metallurgically bonded together over their entire surfaces. No dirt between layers. Peels with penknife.

THE
LAMISOL®
SHIM



FOR QUICK, ASSEMBLY LINE USE

The laminations of the Lamisol Shim (in brass only) are temporarily joined by spot-soldering on the edges. Gauges and number of laminations within one shim are unlimited.

THE
LAMITAB®
SHIM



FOR SUPER SPEED, THIN GAUGE SITUATIONS

The little tab holds shim laminations together firmly, yet is easily removed. Different metals can be used in the same shim.

THE
LOOSE LEAF
SHIM



FOR UNLIMITED FLEXIBILITY

This is the simplest of all custom-stamped shims. It is completely flexible. Usually sets including several different gauges are made up.

PACKAGED
SHIM
STOCK



READY FOR EASY USE, WITHOUT WASTE

Thin gauge 6" x 100" rolls feed through package slots. Heavier gauges in flat envelopes. Available from your Industrial Distributor.



SHIM HEADQUARTERS SINCE 1913

Check Our Stampings Division
For Your Stamped Parts Requirements

USE COUPON for more information

MAIL TODAY!

LAMINATED SHIM COMPANY, INC.
3210 UNION STREET, GLENBROOK, CONN.

Please send me more information on:

☐ SHIMS ☐ STAMPINGS ☐ BOTH

☐ We'd like to discuss our problem with one of your Sales Engineers.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

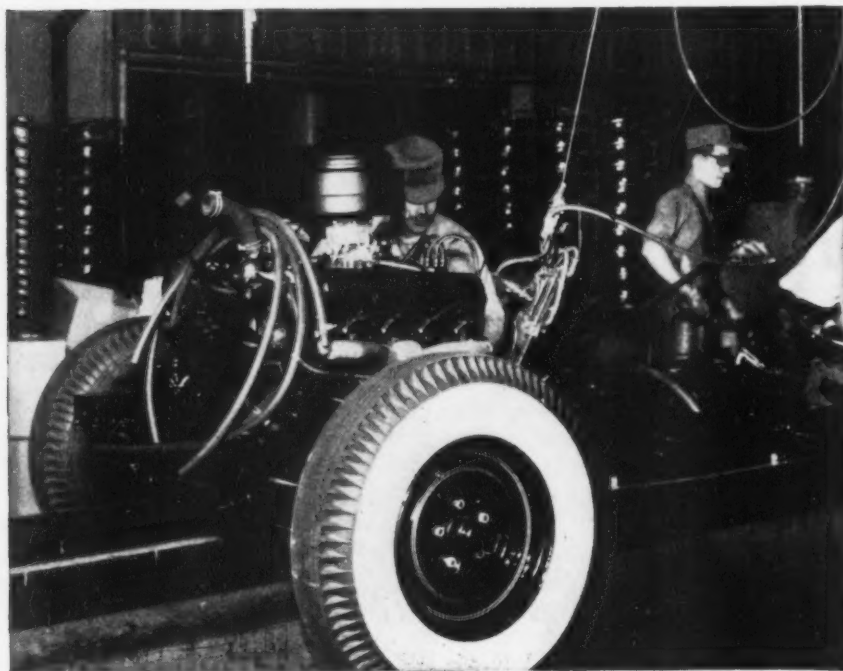
October 9, 1952

293

Tailor-Made Conveyor Systems



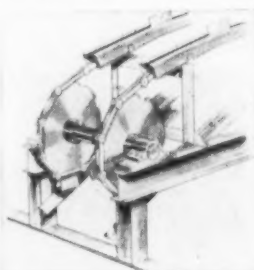
Increase Your Productivity While Lowering Costs With Webb Conveyors . . . Engineered To Meet Every Conceivable Mechanized Conveying Need.



Chassis Assembly Conveyor with continuous high tee-bars.

Typical of the versatility of Webb Conveying Systems are the chassis assembly conveyors in operation at one of the largest and most mechanized automobile plants in Detroit. For 25 years Webb has materially aided this manufacturer in maintaining production schedules and cost controls with installations such as these chassis assembly conveyors, which permit uninterrupted assembly to the chassis of rear axles, wheels, motor, gas tank and transmission.

Put to better use your Overhead, Floor or Underfloor Space . . . Let Webb Engineers Solve the Challenges Presented by your Most Complicated Materials Handling Problems.



Head End Section of Chassis Assembly Conveyor (notched tee-bar type).

CONVEYOR ENGINEERS AND MANUFACTURERS

JERVIS B. WEBB COMPANY

8917 ALPINE AVE.
DETROIT 4, MICH.

OFFICES IN
PRINCIPAL CITIES

FACTORIES IN DETROIT . . . LOS ANGELES . . . HAMILTON, ONT.

The Road Ahead

Continued

Mounting strain on resources most challenging aspect of today's industrial economy . . . Even water short.

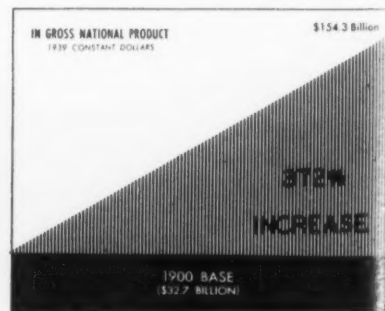
drawing down our most exhaustible resources even faster than the resources that can, in theory at any rate, be renewed. A ton of ore removed from the earth is a ton gone forever; each barrel of oil used up means one less remaining. This mounting strain upon resources that cannot be replaced has become the most challenging aspect of our present-day economy.

"Renewables" strained

But "renewable" resources have also felt the strain. Partly because of soil erosion, even water, once regarded as a "free commodity" of virtually unlimited supply, has become a problem in areas where once it was plentiful.

As a nation we have long lived and prospered mightily without serious concern for our material resources. Our sensational progress in production and consumption has been attributable not only to the freedom of our institutions and the enterprise of our people, but also to our spendthrift use of our rich heritage of natural resources. We have become the supreme advocates of the idea that man and his labor are the most valuable of all, and that inanimate materials are to be used as fully as possible to give men the greatest amount of return for the effort they put forth.

The time has clearly passed when we can afford the luxury of viewing our resources as unlimited and hence taking them for granted. In the United States the supplies of the evident, the cheap, and the ac-



GROSS NATIONAL PRODUCT increased by 372 pct between 1900 and 1950.

Turn to Page 296

est
us-
ort.

ble
re-
any
re-
one
up
his
ces
me
our

ave
use
re-
of
be-
nce

ved
hout
re-
ress
has
the
the
o to
meri-
have
s of
are
that
used
the
the

when
wing
and
In
s of
e ac-

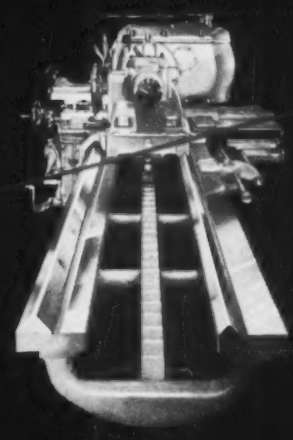
illion

read

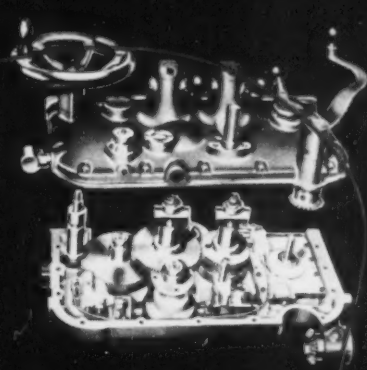
ACE



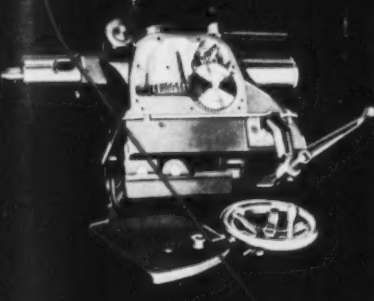
MASSIVE - RIGID



HARDENED STEEL - PRECISION GROUND



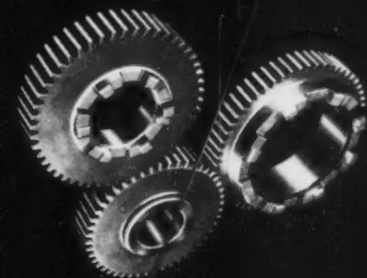
PROTECTED FOR LIFE



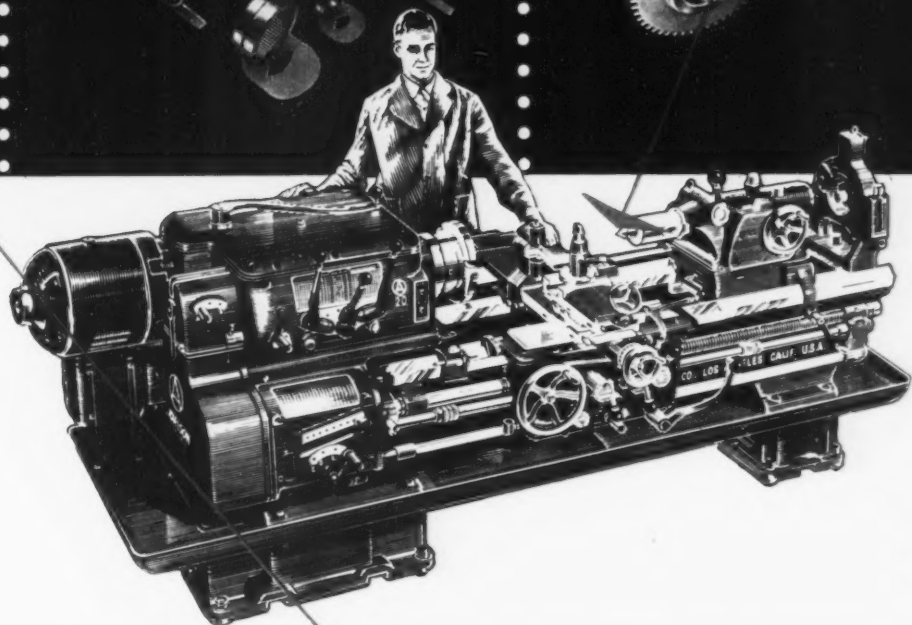
TWO SPEED TAILSTOCK



AS FRICTION FREE AS HUMANLY POSSIBLE



QUIET - SMOOTH - TOUGH



AXELSON LATHES . . . Chosen first to last! Axelson engine lathes are accurate — there isn't a more accurate lathe on the market — they are dependable, they have stability — they keep their precision under continuous, heavy service — they are recognized internationally as the quality tool by men demanding the utmost in metal working equipment. ■ Axelson manufactures heavy duty engine lathes in 16", 20", 25", and 32" sizes of various lengths; precision tool room lathes; a 20" medium duty engine lathe; gap lathes.

Chosen first....to last!

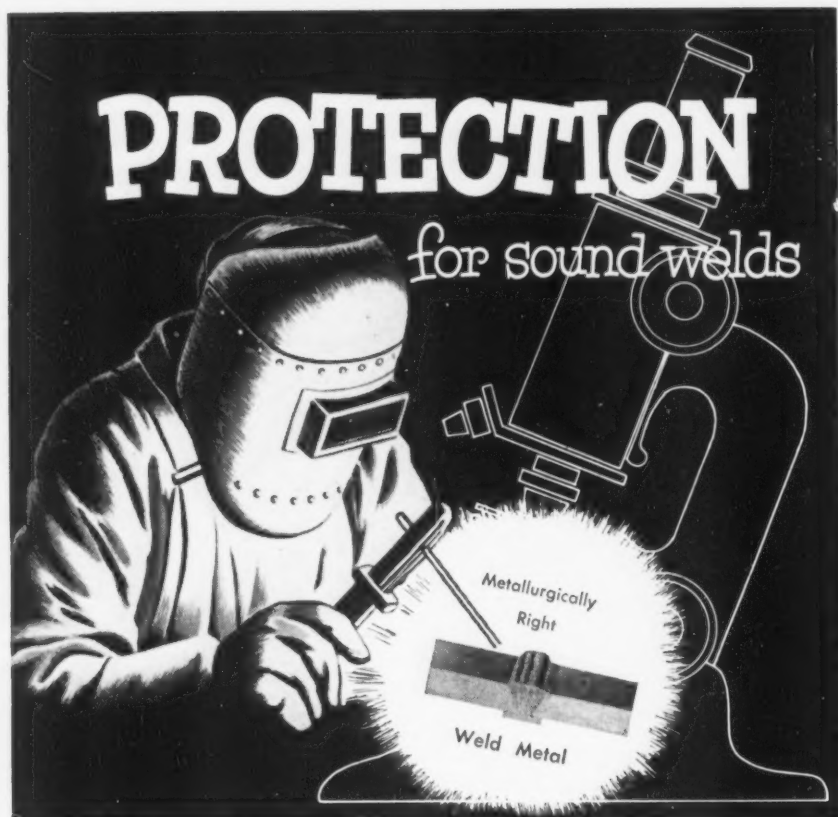


AXELSON
Lathes

THERE IS NO ECONOMICAL
SUBSTITUTE FOR QUALITY

TOOL ROOM LATHES • GAP BED LATHES • HEAVY DUTY ENGINE LATHES

AXELSON MANUFACTURING CO. • LOS ANGELES 38 • NEW YORK 7 • ST. LOUIS 16 • Authorized Distributors in All Principal Industrial Centers



Use ARCOS "Quality Controlled" Stainless Electrodes

In the split-second flash of an arc, Arcos stainless electrodes produce the "right" weld metal for the job at hand. This is the result of Arcos' experience with fabricators' welding problems . . . competent research in the behavior of various grades of electrodes in use and weld metal in service . . . a strict application of quality control in manufacture.

The value of any electrode lies in the quality of the weld metal it produces. And that's where Arcos strives to build the values that count . . . soundness, specific mechanical or corrosion resistant properties, or microstructures that can stand-up to destructive service conditions. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Penna.

WELD WITH



ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

The Road Ahead

Continued

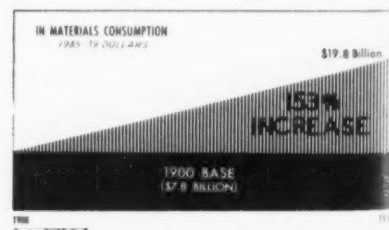
We're skimming the cream from resources as now known . . . New appreciation of materials uses needed.

cessible (chemically and geologically) are running out. The plain fact seems to be that we have skimmed the cream of our resources as we now understand them; there must not be, at this decisive point in history, too long a pause before our understanding catches up with our needs. We are much more supple today in our uses of materials than our ancestors were in the past; but when we consider the number of materials our ancestors did not use, it will become us to remember that frequently they left much unused not because it was undiscovered, but because they did not know what to do with what they knew to exist. Long after petroleum was discovered, refiners threw away what would today be described as gasoline, because it presented to them only the aspect of a dangerously volatile and inflammable liquid; its energy content was known, but not appreciated.

Growth of demand

Growth of demand is at the core of the materials problem we face; it is the probability of continued growth, even more than the incursions of past growth and two world wars, that present us now with our long-range problem. It is mainly our unwillingness to stand still, to accept the status of a "mature economy," that challenges the adequacy of our resources.

In contrast to other industrial nations, we have been able in the past to satisfy the bulk of our materials demand from our own domestic resources, with much to spare for export. Accordingly the United States has used up its resources consider-



MATERIALS CONSUMPTION increase between 1900 and 1950 rose 153 pct.

The Road Ahead

Continued

1940's mark crucial turning point in nation's long range materials position . . . Exporter to importer.

ably faster than the rest of the free world. With less than 10 pct of the free world's population and 8 pct of its land area, the United States consumes close to half the free world volume of materials.

Facts of this sort about our past and present raise serious questions about the future. How long can this go on? How adequate are our remaining resources to support future demands against them? What alternatives are available to us for meeting our future needs? We who view the Materials Problem from the vantage point of the United States in 1952 can best prepare ourselves for discerning the future by a brief tracing of the path which has led to the present.

Turning point

The decade of the 1940's marked a crucial turning point in the long-range materials position of the United States. Historical trends long in the making finally came to a climax when the national economy moved just prior to the war from a long period of depression into a period, still continuing, of high employment and production. By the midpoint of the twentieth century we had entered an era of new relationships between our needs and resources; our national economy had not merely grown up to its resource base, but in many important respects had outgrown it. We had completed our slow transition from a raw materials surplus nation to a raw materials deficit nation.

Danger symptoms

The symptoms of this changed materials position are today numerous; we have become the world's largest importers of copper, lead, and zinc, whereas once we were huge exporters. We have begun to meet from foreign sources a sizable and growing portion of our needs for petroleum and iron ore, which long were hallmarks of United States self-sufficiency. We have shifted from net exporter to net importer of lumber. There are today

Turn Page



**ONE
ELECTRODE**
for all positions

Use ARCOS Low Hydrogen Electrodes

ARCOS GRADE	A.W.S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9015
Manganend 2M	E10015
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

When you can deposit sound weld metal without changing electrodes to meet different welding positions—and use the same electrode on A-C or D-C current—you're saving time and inconvenience. With few exceptions, all types of Arcos Low Hydrogen Electrodes offer this advantage on a variety of base metals. That means a smaller inventory, since you can safely weld many jobs from start to finish with ONE ELECTRODE. Because Arcos Low Hydrogen Electrodes are "quality controlled," there's no danger of underbead cracking. ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Penna.

WELD WITH

ARCOS

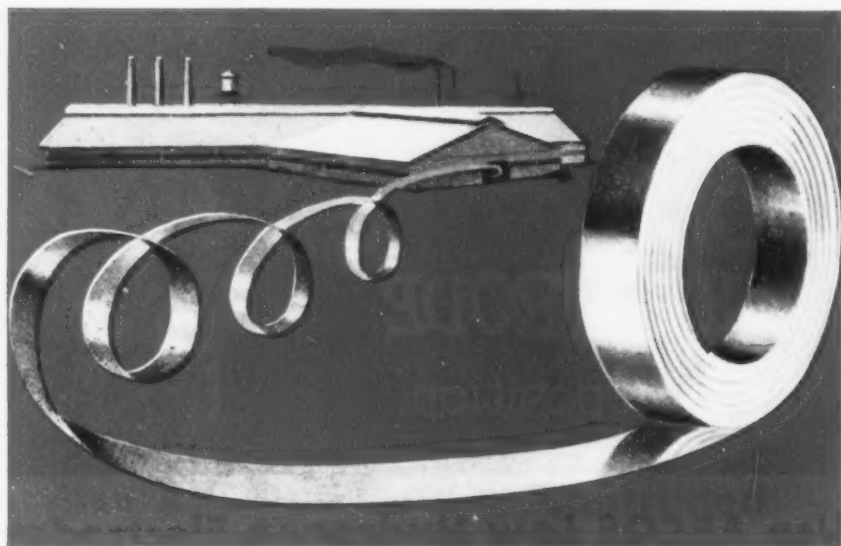
Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes



FOLLANSBEE COLD ROLLED STRIP

FOR

**CUSTOM-QUALITY
WITH CUSTOM-SERVICE**



For your strip requirements for any type of production—specialty or run-of-mill—you may use Follansbee Cold Rolled Strip with complete assurance. It is rolled, tempered and supplied to your specifications. Follansbee Cold Rolled Strip provides a continuous supply of uniform steel from coils to your automatics, regardless of forming operations involved.

Follansbee Steel Corporation is set up to supply you with quick, direct, personalized service.

**Consult your trained Follansbee Steel representative.
He will be glad to discuss your
fabricating problems with you.**

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

POLISHED BLUE SHEETS AND COILS SEAMLESS TERNE ROLL ROOFING
COLD ROLLED STRIP

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada.
Mills—Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa.

Rochester, N.Y.

Fairfield, Conn.



—The Road Ahead—

Continued

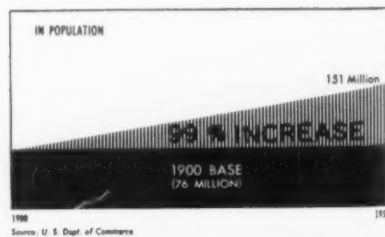
Changing patterns in materials use linked to changing national economy . . . Now consumer nation.

only two metals (magnesium and molybdenum) for which we are not partially dependent on foreign supplies.

The United States has never been completely self-sufficient in raw materials; had we insisted on being so, our economic output and living standards today would be considerably lower than they are. We began as an "underdeveloped" nation with rich resources but a shortage of manpower and capital, and little industry. For a long time we were predominantly agrarian; as late as 1870, we had three farmers for every manufacturing worker. It made good sense for us then, as it does for many less developed countries today, to concentrate on the export of raw materials and agricultural products as the best means of acquiring purchasing power abroad with which to support better living standards and economic growth.

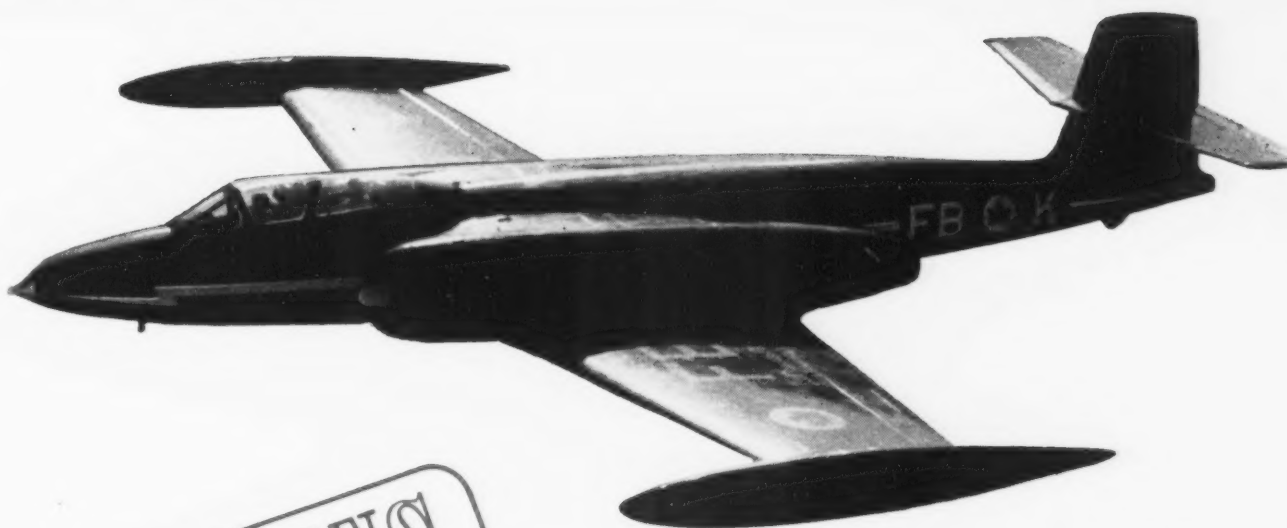
Markets change

With the growth of manufacturing, United States foreign trade burgeoned, and its composition underwent drastic change. As a seller in world markets, we shifted emphasis from raw materials to manufactured goods; as a buyer, we shifted emphasis from finished goods to raw materials. As a result of these shifts, crude materials fell from over 60 pct of our merchandise exports in 1820 to less than 15 pct by 1946-50; conversely, finished manufactured goods rose from less than 6 pct of our exports in 1820 to 52 pct by 1946-50. Opposite changes



POPULATION has set the pace for growth in national economy during half century.

Turn to Page 300



Precision Performance of Canada's "Orenda" Jet... Demands Precision Plating:

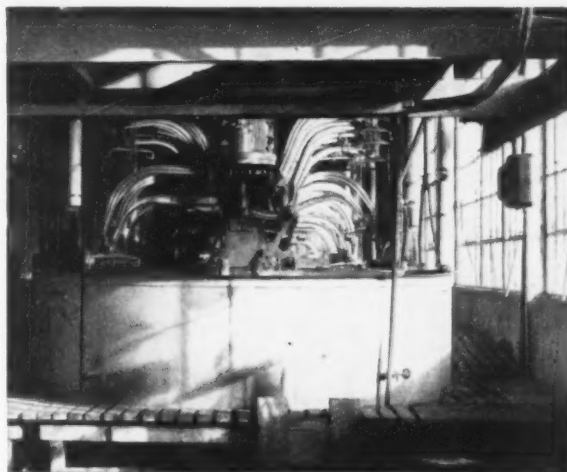


The A. V. Roe Company, Ltd., manufacturer of the famous ORENDa jet engine for the Avro CF-100 "CANUCK" all-weather fighter *must* have precision plating.

That's why they selected Frederic B. Stevens of Canada, Ltd., to *completely* outfit the Malton, Ontario, Jet Engine Plant of the A. V. Roe Company, Ltd., with plating equipment.

Plating, anodizing, chromating and blackening machines are all by Stevens. That's because extreme accuracy is obtained with Stevens equipment. The A. V. Roe Company, Ltd., know *specification* processing is a routine production operation when they use Stevens.

If you have a precision plating and processing problem, see your nearest Stevens representative or write direct . . . **FREDERIC B. STEVENS, INC.**, Detroit 16, Michigan.



Stevens Model B Automatic Rack-Type Plating Machine.

Visit us at the Metal Show—Booth 244.
National Metal Exposition, Philadelphia Convention Hall, Philadelphia, Pa. October 20-24, 1952.

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B.

BUFFALO • CHICAGO • CLEVELAND
INDIANAPOLIS • NEW HAVEN

Representations in Other Selected Cities

STEVENS
DETROIT 16, MICHIGAN

INCORPORATED

FREDERIC B. STEVENS OF CANADA, LTD.
WINDEB • TORONTO
ONTARIO

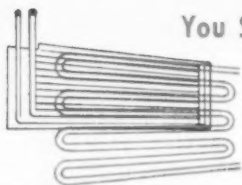


Now Available

STAINLESS STEEL PLATECOILS

REPLACE PIPE COILS

to SAVE YOU 50% in TANK HEATING and cooling



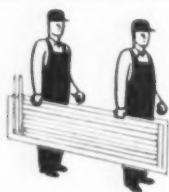
You SAVE 50% in tank SPACE

A 22" x 47" Platecoil gives the same heat transfer surface as 32 ft. of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil in space inside your tank.



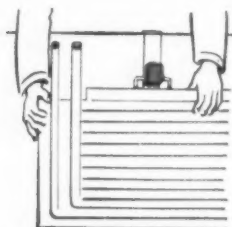
You SAVE up to 50% in initial COST

The initial cost of stainless steel Platecoil is often 50% or more below the cost of equivalent pipe coil. Less time is required to install Platecoil with corresponding saving in installation labor.



You have 50% LESS WEIGHT to handle

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install it.



You SAVE 50% in maintenance LABOR

The Platecoils can be replaced in a matter of minutes and without emptying the tank. There is no need for workmen to get inside the tank in order to make replacements.

Send for your free copy of the new brochure of Platecoil applications. Write for Bulletin No. P73.



The Road Ahead

Continued

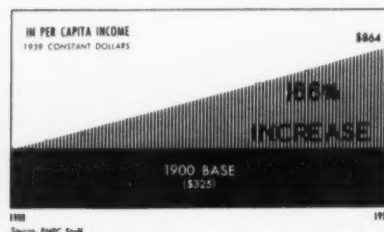
Future demand depends on expansion rate of U. S. and world economy . . . Output may double by 1975

occurred in our pattern of imports.

The inevitable has now come to pass. Whereas for many decades the United States economy produced more raw materials than it consumed and thus had a net outflow of materials to the rest of the world, we seem now to have settled solidly into the position of consuming more materials than we produce.

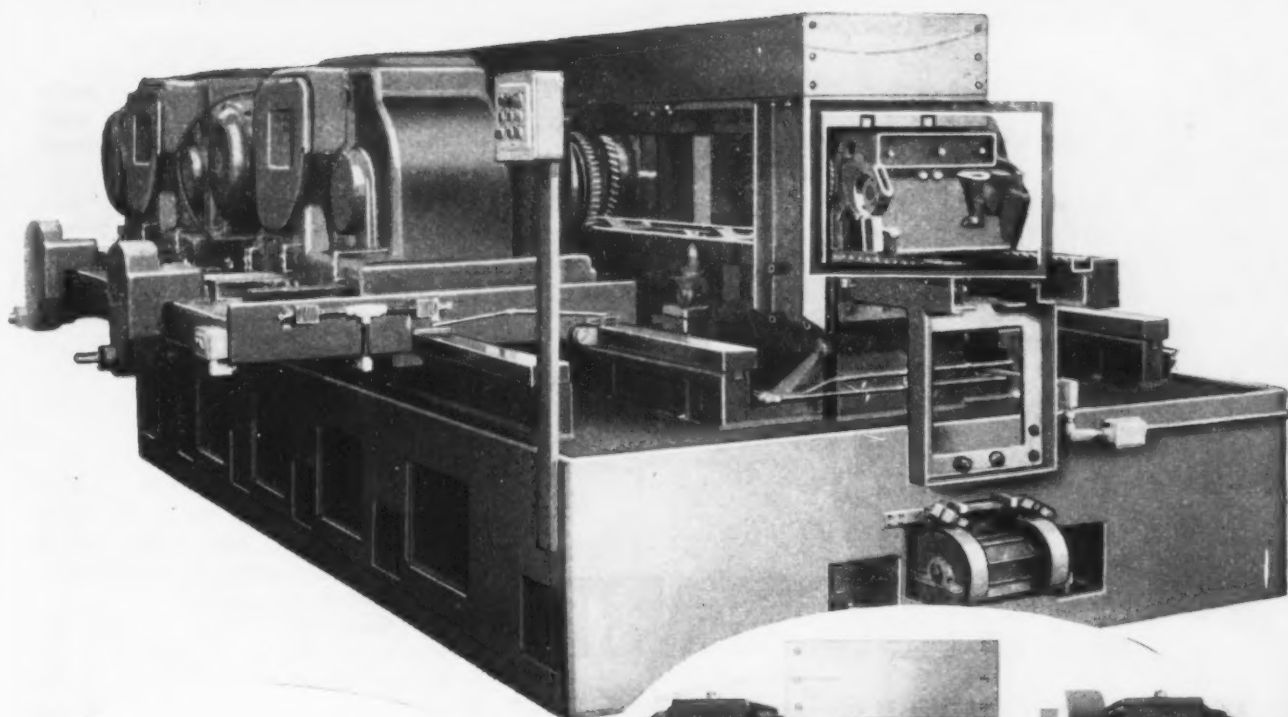
Control factor

The size of future materials demand, and the adequacy of supplies, will depend upon the rate at which the United States economy and that of the whole free world expands. If we assume for the moment a favorable set of materials supply conditions, the size of our national output by 1975 will depend mainly upon the size of total population and working force, the number of hours worked per week, the accumulation of capital that has by then occurred, and upon the rise in man-hour productivity. Taking these various factors into account, this Commission believes it is reasonable to anticipate a rate of growth for the United States economy in the future roughly equal to the past rate of growth, or about 3 pct a year. This means that by 1975 total national output (the total of all our goods and services, known as gross national product, or GNP) would be approximately double that of 1950. Estimates of population range between 180 and 220 million; the Commission has assumed, after consultation with the Bureau of the Census, a population of 193 million



PER CAPITA INCOME, based on a 1939 constant dollar has shown 166 pct rise in 50 years.

Turn to Page 302



ANOTHER

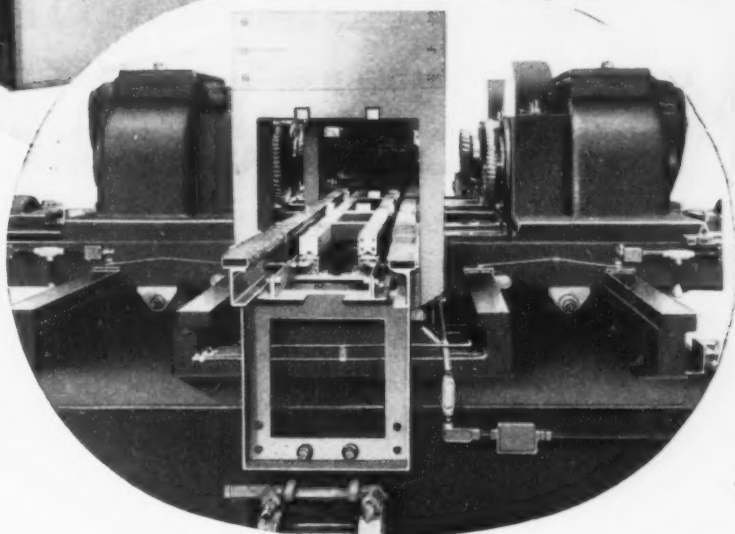
Automatic Transfer Milling Machine

DESIGNED AND BUILT BY

MOTCH & MERRYWEATHER

to Rough-Mill and Finish-Mill Both Ends of Automotive Cylinder Blocks

- Cylinder blocks are fed to the machine, transferred from station to station, and discharged to the next operation. This machine forms an important link in a completely automatic production line.



End view showing transfer mechanism and 75 h. p. milling heads in retracted, accessible position.

Manufactured by — **THE MOTCH & MERRYWEATHER MACHINERY CO.** —

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION - WITH - ACCURACY • MACHINES AND EQUIPMENT



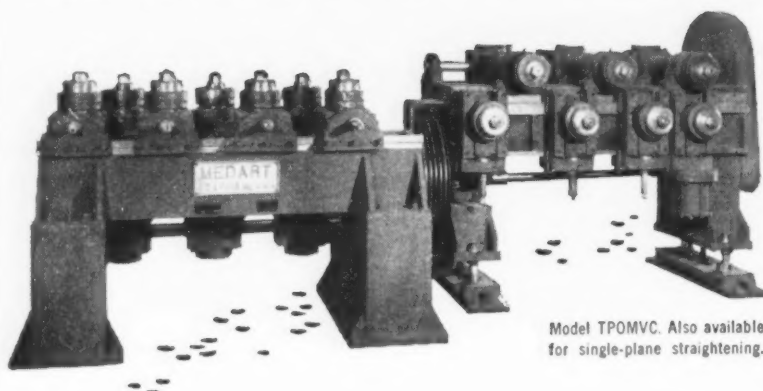
Versatile! Variable Centers!

Faster Straightening Of An Extreme Range
Of Shapes On This **New** Machine



Two-Plane-Overhung Roll-Variable Center

SHAPE STRAIGHTENER



Model TPOMVC. Also available
for single-plane straightening.

- Combines the fast, simple setup advantage of an overhung roll straightener, with exceptionally versatile control of bending stresses possible only in a movable-roll center type of machine.
- Variable center roll housings permit adjustment of bending spans for handling an extreme variety of shapes and sizes. This feature prevents overloading of bearings and assures uncommon accuracy.
- Bottom rolls can be moved directly under top rolls for cross-rolling or reforming cross sections of distorted extruded or other shapes simultaneous with straightening action.
- Top and bottom rolls, when set in opposing pairs, act as additional pinch-feed rolls for extra traction required for difficult-to-straighten shapes.
- Rolls are quickly and easily changed by removing locknut on end of each shaft.
- Rolls are of Medart Smavroc alloy steel hardened and ground to shape ... All gears operate in oil within enclosed housings ... Pinch-feed rolls at end are air-operated. Timken bearings throughout.

Write For Complete Details

THE MEDART COMPANY 3535 DE KALB STREET
ST. LOUIS 18, MISSOURI

—The Road Ahead—

Continued

Future demand for major materials projected . . . Large substitution trends clearly evidenced.

by 1975 and a working force of 82 million, with a work-week perhaps 15 pct shorter than in 1950. These factors imply an annual rise of 2½ pct in production per man-hour against a somewhat smaller past rate of 2.1 pct because it seems reasonable to expect considerably steadier levels of employment and economic activity in the future, in line with the avowed national objective of making major depressions a relic of the past. This does not preclude, however, the possibility of milder fluctuations.

Based upon the foregoing, the Commission has projected the general magnitude of demand by 1970-80 for various major materials. These projections do not predict how much of each material will actually be available and consumed. Instead they are an estimate of what might be demanded *if relative prices of various materials remained the same as in early 1950*, which they are most unlikely to do. Moreover these projections assume no unforeseeable new uses, substitutions, or technological improvements. They are intended solely as a starting point in the analyses of prospective supply-demand conditions and give only a rough measure of magnitudes.

Demands will vary

The demand for various materials under these circumstances is expected to rise quite unevenly, in some cases going up as little as one-quarter, in others rising fourfold or more (see chart). Demands are expected to vary according to main uses with which the materials are associated and to reflect the extent to which large substitution trends of one material for another are already clearly in motion.

Although these projections may look high by today's standards they may well prove too low by tomorrow's; for they reflect in some cases a somewhat smaller annual rate of increase of demand for the future than has characterized the past. Based on past experience, it can be

Turn to Page 304

Banish the "Bite"



ON PICKLING AND PLATING EQUIPMENT

with these **NATIONAL CARBON AND GRAPHITE AND**
TRADE-MARK
KARBATE IMPERVIOUS GRAPHITE PRODUCTS
BRAND

Pickling and tinning are messy, expensive — and *necessary*. However, you can *greatly reduce* equipment maintenance costs and improve plant housekeeping by making full use of these National Carbon products wherever service is dirty and tough. As is well known by manufacturers of your pickling and plating *solutions*, only carbon and graphite and impervious graphite withstand the "bite" of so wide a range of corrosive chemicals.

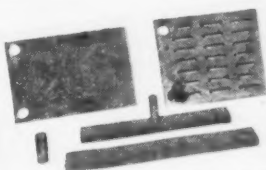
HERE'S WHERE THEY'RE USED:

STAINLESS PICKLING



Carbon brick tank linings with "Karbate" Plate-Type Heat Exchangers and drain lines offer powerful resistance to nitric-hydrofluoric solutions.

ELECTROLYTIC PLATING

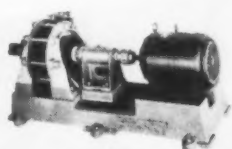


Graphite Anodes, either alone or in combination with dissolving-type anodes, are non-contaminating and long lasting.



Various immersion-type and shell-and-tube type "Karbate" Heat Exchangers are available to suit capacity requirements.

CARBON STEEL PICKLING



"Karbate" pumps and piping resist sulphuric and hydrochloric acid attack... protect solution from contamination.



"Karbate" Shell-and-Tube Heat Exchangers are often most economical where more than 50 square feet of heat transfer surface is required.



Graphite Tank Rolls provide an ideal combination of good electrical conductivity and resistance to acid attack in electrolytic pickling operations.

WRITE FOR CATALOG SECTION—S-5005

OTHER NATIONAL CARBON PRODUCTS

BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

The terms "Karbate" and "National" are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
 A Division of Union Carbide and Carbon Corporation
 30 East 42nd Street, New York 17, New York

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

IN CANADA: National Carbon Limited, Montreal, Toronto, Winnipeg

"MULTICUT" "TUFCUT" "HOT WORK"

Wapakoneta

SHEAR BLADES and ROTARY KNIVES



Any type or size blade of proper
Alloy with correct hardness and
temper for every type shearing
machine and every kind of job.



R_x ENGINEERED
TO THE JOB

Every Wapakoneta blade is
made to exact specifications,
designed for the particular job.
Complete records with order
number of each blade makes
possible duplication of exact
size and temper at any time.

The
WAPAKONETA MACHINE CO.

Shear Blade Specialists Since 1891

Wapakoneta, Ohio

The Road Ahead

Continued

Supply-demand factors have strong
international influence . . . Pro-
jections consider world trade.

expected that considerably less than a doubling of total materials "input" will be required to achieve a doubling of national output. In 1900, for example, each dollar of raw materials cost supported only \$4.20 worth of finish goods and services; by 1950 the raw materials dollar was supporting \$7.80 worth (after discounting for changes in the general price level). Reasoning from this trend it seems probable that somewhere between a 50 and 60 pct increase in the *total* materials stream will be needed to achieve a doubling of total national production in the 1970's, with demand for metals and mineral fuels rising more than this average, agricultural demand somewhat less, and forest products demand considerably less.

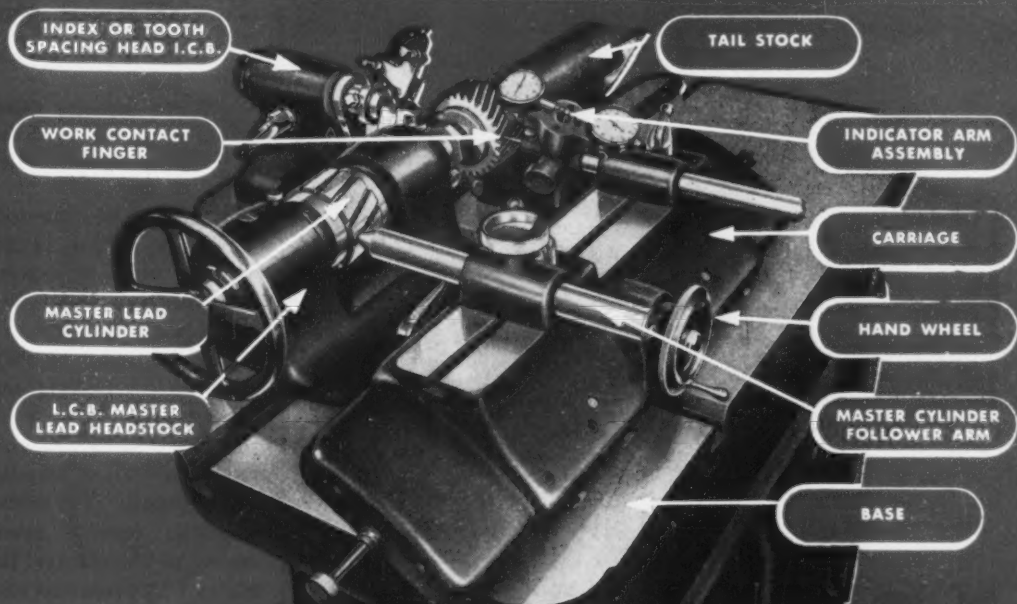
U. S. influence

What happens to United States demand and supply will have a strong influence on the materials situation of other nations since many of these materials have international markets, and developments abroad will similarly have their impact in this country. For these reasons the Commission in its estimate of the future has made allowance for other free world demand although projections of foreign demand trend are necessarily even less definite than those made for the United States. These estimates suggest that total free world demand for materials will expand considerably in the next generation and that the United States, although its total consumption of materials will increase greatly, will probably consume a somewhat smaller share of the total supply.

Wide differences

There is room for wide differences of judgment in this difficult area of demand projections, but one point of overriding significance stands out. Whether it is estimated that the demand for a particular material will rise 50 pct, 100 pct, or 200 pct, the central point is that

Turn to Page 306



Red Ring Lead Comparator—slide assembly on the right of the work contact with the I.C.B. index or tooth space checking hand on the other side.

LOCATE AND EVALUATE GEAR ERRORS *QUICKLY and ACCURATELY*

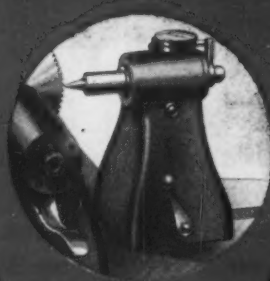
Errors in each of the several gear characteristics can be quickly analyzed and evaluated on the Red Ring Universal Gear Checker.

This instrument with 5 interchangeable heads indicates errors in tooth size, spacing, helix angle, lead, eccentricity, parallelism and wobble. This Checker is rugged enough for the production shop—sensitive enough for the gear laboratory—simple enough for the average shop man to use effectively. No special skill is required—ideal for the rapid inspection of mass-produced gears.

For more detailed information and specifications ask for Bulletin C-51-6.



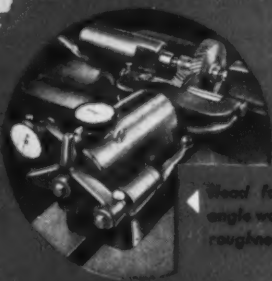
Model SIC Head checks helix angle, eccentricity and tooth size.



Model ECA Head checks eccentricity and tooth size.



Model CPA Head checks parallelism.



Head for checking helix angle, wobble, eccentricity, roughness of roll and size.

SPUR AND HELICAL
GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

VERSATILE!

General machine shop and maintenance work often require an *all-purpose* heavy duty open-gap forcing press adaptable to the many kinds of operations involved. That's what makes this versatile 100-ton R. D. Wood HydroLectric press valuable to *you*, from both cost and production standpoints. Moreover, it's used for machinery and appliance component assembly on a production basis, with the addition of suitable fixtures and accessories. It's made in various sizes and capacities, to strict R. D. Wood manufacturing standards. Write, without obligation, for literature.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ROLLFORMERS • EXTRUDERS • INTENSIFIERS

EST. 1803



R.D. Wood Company

PHILADELPHIA, PENNSYLVANIA, U.S.A.

—The Road Ahead—

Continued

Static economy rejected . . . See greatly increased demands underscoring basic materials position.

demand can be expected to rise substantially. This is not always a popular view to espouse. No one feels quite so crestfallen as the host who prepares for a celebration which then fails to occur, and businessmen the world over are certainly more fearful of producing too much of their product than of having a certain amount of unsatisfied demand. Yet economic history certainly records more underestimates of the future than overestimates. Depressions and recessions, historically viewed, become smaller episodes in a longer and more heroic tale. There is no reason to assume that a world which has been growing economically by leaps and bounds for many generations will suddenly become static in this generation. It is this certainty of greatly increased demand for materials in the future that underscores the importance of the fundamental shift in the basic materials position of the United States during the past decade.

Some sunlight

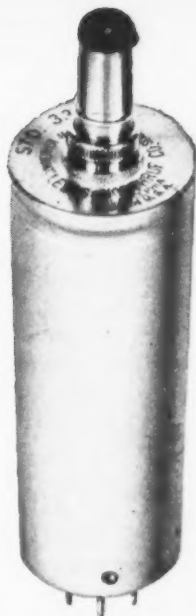
If the United States were forced to live within the rigid structure of its present materials position, its future outlook would be bleak indeed. We would have to meet all future needs from the domestic resources we now have and know how to use. Our technique of using materials would be frozen in its

Turn to Page 308



"They say their new model will knock your eyes out."

A lot of engineering for a Component!



Converter's job in Speedomax instruments is to receive the (often very small) direct current signal which is related to the temperature, stress pH or other condition being measured, and produce an alternating voltage. This output is amplified, and then directs the balancing system to measure, record, and if desired control.



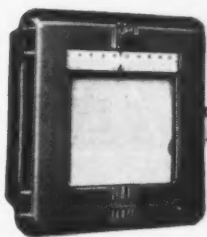
Good engineering shows in this Amplifier's thorough filtering, high impedance, and plug-in connection to the rest of the Speedomax.

Good engineering shows in this Slide-wire's non-inductive winding and in absence of any flexible leads which might form inductive loops.



Good engineering shows in this balancing motor's small size, and in its torque ample to operate accessory control and signalling fittings.

and every Speedomax user benefits by it!



• The operating precision of the thousands of Speedomax Recorders and Controllers which serve industry and science begins with the engineering of components like this Converter. Our specifications apply at all stages—all the way back to the plants which make metals, insulation materials, etc., for us. These specs represent also the best thinking of our

suppliers' engineers. The resulting materials are thus quality-controlled for us—and us alone.

From these materials our engineers tell our factory how to make converter parts to truly tight specifications. Some parts require principally flatness, or elasticity, or dimensional stability. Reeds need correct natural frequency. Many parts of course combine various needs; each gets its requirements.

Life tests show Fidelity and Stamina. Ingenious and often original design creates from these parts a converter with noise level equivalent to only 0.2 microvolt in an emf potentiometer circuit. And this fidelity promotes accurate measurement and control.

Running on life tests since 1948, present-model converters are today still well inside performance tolerances. Such a run equals 21.9 years of 8-hours-a-day, 200-days-a-year-service—or 1.9 years more than the present age of the first Speedomax.

This kind of engineered performance is also built into the amplifier, slidewire, motor and scores of other exclusively Speedomax parts. It's at your service whether you want to control temperature of steel billets, or record the laboratory studies of steel molecules. Call on L&N application engineers in selecting the exact range (from among thousands) and the exact measuring circuit (from among 2300) to meet your needs. Write our nearest office, or 4956 Stenton Avenue, Philadelphia 44, Pa.

CAREER OPPORTUNITIES AT L&N

Expansion program of this long-established firm has many features to attract outstanding recent graduates in engineering and science. Opportunities are in sales, field engineering, product and application engineering, research, advertising, market development. Widely-respected policies assure recognition of progress and achievement. Address Personnel Manager for preliminary interview at nearest of 17 L&N offices.



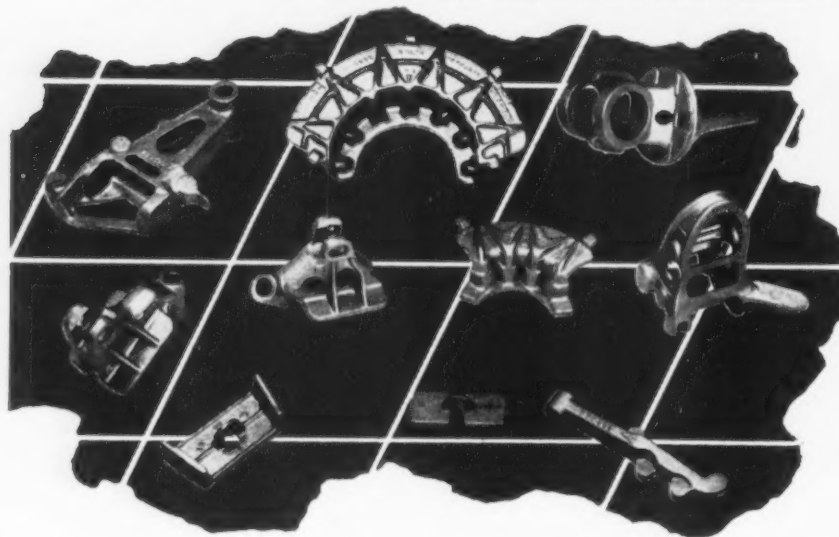
Instruments • automatic controls • furnaces

Jrl Ad ND46(6c)

UNITCAST

Daily rides the **AIRPLANES**

(Aircraft castings used directly or as an accessory attachment)



UNITCASTINGS

..ENGINEERED TO "TAKE IT"

Each of the above castings is the result of cooperative designs embodying the best-known foundry techniques available to assure the production of HIGH STRENGTH, MINIMUM WEIGHT, DEFECT-FREE castings. Each part is either percentage checked or 100% checked by radiographic and magnetic particle inspection.

Unitcast HAS met and WILL continue to meet the demands of industry, producing pre-determined TOP QUALITY castings, as shipped, and with personal follow-up to check machinability, fixture fit, assembly fit, etc., in YOUR PLANT.

Your successes reflect on our books. May we offer our services to challenge any knotty problem your product may present to the castings industry.

UNITCAST

Corporation

QUALITY STEEL CASTINGS



Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends.

Write or call today. Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. In Canada: Canadian - Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED

The Road Ahead

Continued

U. S. uses only small fraction of total resources . . . Discovery of new uses keeps position strong.

present mold. Each successive year would further deplete reserves, materials costs would rise geometrically, production would shrink and the clock of economic progress would run down.

Fortunately the outlook, although serious, is not as bleak as that. Our materials position is flexible and we have opportunities to improve it along three main lines:

1. We can get more materials and more energy from our domestic resources by pushing back the technological, physical, and economic boundaries that presently limit the supply.

2. We can alter our patterns of using materials by more efficient designs and processes — and by shifting the burden of use away from scarcer materials, toward more abundant ones.

3. We can get more materials from abroad, on terms beneficial to ourselves and other free nations.

Opportunities

These opportunities are both real and promising, but their full benefits will never be realized except by earnest and unremitting effort.

The United States even today makes practical use of only a small fraction of its total resources. Our total resource base, broadly conceived, includes all components of the earth's crust within our borders, together with the atmosphere, water, climate, and the energy forces of nature, but the usable sector of that base is limited by the combination of physical, technological, and economic conditions prevailing at any one time.

As conditions change, the base of usable resources also changes. Past depletion notwithstanding, this nation today has a far broader and stronger usable resource base than ever before, mainly because over the years we have discovered resources and uses unsuspected by our ancestors. The bayberries of Cape Cod and the sperm whales off Nantucket were vital resources to the early inhabitants of Massachusetts,

Turn to Page 310

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.
2167 SCRANTON ROAD • • • CLEVELAND 13, OHIO



"SHINYHEADS"

America's Best Looking Cap Screw
Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.



"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.



FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.



"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.



CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.



"HI-CARBS"

Heat Treated Black Satin Finish
Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.



SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.



FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.



ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.



SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.



FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.



STANDARDS
carried by
**LEADING
DISTRIBUTORS**

SPECIALS**
furnished to
**BLUE PRINT
SPECIFICATIONS**

**WRITE FOR
INFORMATION**

SEND FOR SAMPLES

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

When
the job is
SPECIAL

- A special fastener often can improve product design and performance while cutting production costs. When you specify a Buffalo Bolt "Special"... you can be sure it is designed for the job and made by the most modern methods to the highest standards.
- If you don't have our latest catalog, drop us a line on your business letterhead. Ask for NO. 51.




BUFFALO
BOLT COMPANY

Division of Buffalo-Eclipse Corporation
North Tonawanda, N. Y.
Sales Offices in Principal Cities

PRODUCERS OF CIRCLE B PRODUCTS — BOLTS & NUTS & RIVETS AND SPECIAL FASTENERS

—The Road Ahead—

Continued

Can world provide expanding material flow in "mix" to fit its needs? . . . Richer veins in earth.

as was the buffalo to the plainsmen. It was irrelevant to them that nature had created huge pools of petroleum under the topsoil of Texas, great bodies of iron ore in Minnesota, waterfalls in Washington, and phosphates in Florida. It is equally irrelevant to us today that the candles, the whale, and the buffalo have all but vanished from the scene; but it is of high importance that the resources of the West have been opened up, that the invention of the internal combustion engine has made petroleum a valuable resource, that technology has taught us how to make aluminum from bauxite, and plastics from such abundant resources as coal, water, and air. By discovery, development, and technology, the materials stream which flows from our resources has been tremendously enlarged and its composition vastly altered, while the cost of materials measured in human effort has, until recently at any rate, steadily declined.

Progress speed

The big question now is whether such progress in resource use can continue, both here and abroad, at a rapid enough pace and at a low enough cost to provide us with an expanding flow of materials in a "mix" to fit our needs. No one can be sure, but we do know that we can attack the question from both sides—that of supply, and that of use. In expanding our mix, we can work on supply by finding more of our familiar materials; by using our known resources more fully; by using resources of lower quality; by really renewing our "renewables"; by finding uses for unemployed materials and by synthesizing new substances. No one of these supply possibilities excludes any other; indeed, combinations of these efforts are essential.

Exploration and Discovery. Most major metal discoveries have been made by following surface ore exposures in the mountain regions. By now few of these exposures re-

Turn to Page 312

NEW

Fast Arc Blowout



Two Type 260 DC Contactors, 150 amp, single pole, normally open, with auxiliary switch. One arc chute has been removed to show control detail. Type 260 DC Contactors with the new Arc Centering Feature are rated 600, 300 and 150 amps at 600-volt maximum.

- Speeds Arc Interruption
- Extends Contact and Chute Life

THIS NEW HEAVY DUTY CONTACTOR offers an *entirely new* principle of arc interruption... developed by Allis-Chalmers engineers to meet the exacting needs of industry.

Contact and arc chute life have been greatly extended by an *arc centering blowout*. In centering the arc, increased blowout action and fast interruption results from a combination of thermal convection and magnetic action. Contact erosion is reduced and carbonization is minimized.

Other advantages of the Mill Type 260 DC Contactor include: accessible construction for easy maintenance; ROLLING contact action with no destructive scuffing; design simplicity which has eliminated troublesome linkages, arms and pivots.

The Type 260 DC Contactor featuring the new arc interruption principle has been designed and built to steel mill engineers' specifications. Years of field and factory tests have proved this heavy duty contactor far exceeds NEMA requirements... have established it as an efficient, trouble-free performer under the most severe operating conditions. Call your nearby Allis-Chalmers District Office or write to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 14B6505A.

A-3871



How Arc Interruption Principle Works

Arc Chute Assembly consists of triangular metal plates with U-shaped segments mounted alternately. Plates are insulated from each other and are placed at right angles to circumference of contact travel.

Metallic segments act as individual blowout coils.



Arc is forced upward along arc runner by blowout coil and impinges on metal segment of arc chute.



As contacts separate further, arc is stretched across an increased number of segments.

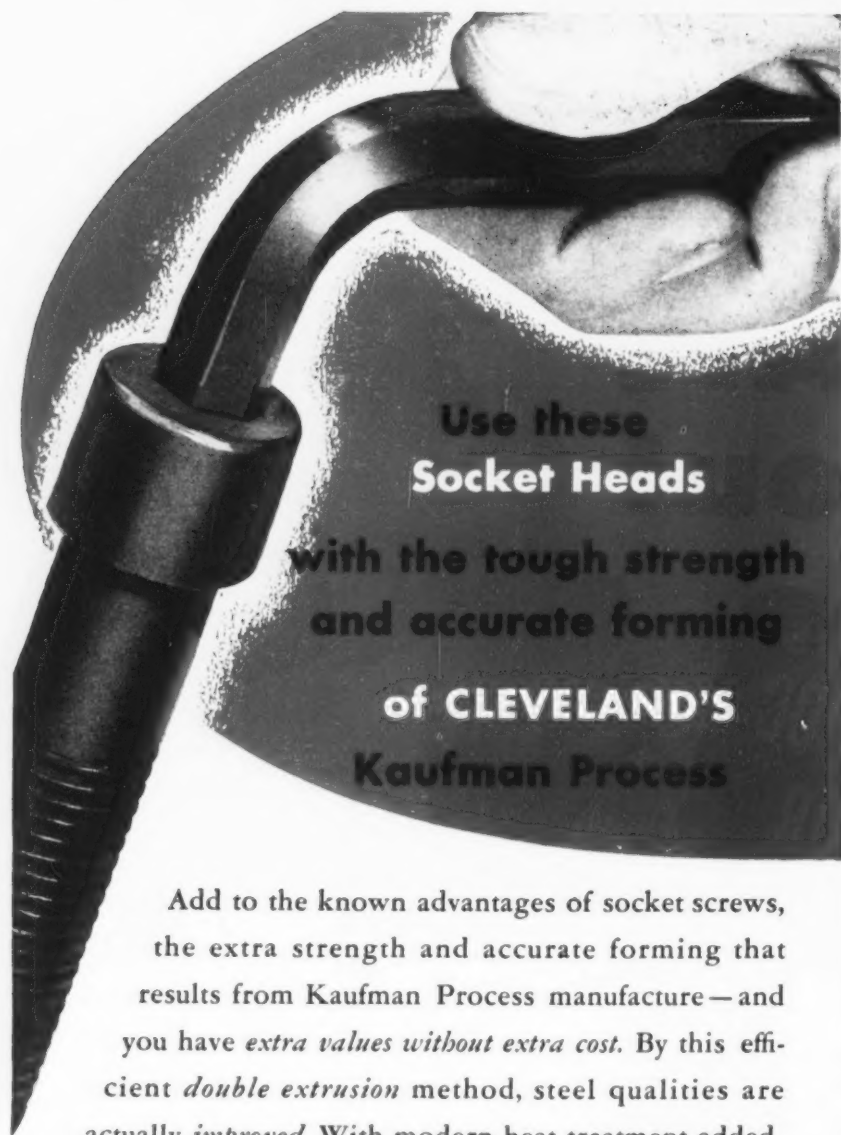


Arc rises quickly due to thermal and magnetic action of each individual metal segment.



ALLIS-CHALMERS

October 9, 1952



**Use these
Socket Heads**
with the tough strength
and accurate forming
of **CLEVELAND'S**
Kaufman Process

Add to the known advantages of socket screws, the extra strength and accurate forming that results from Kaufman Process manufacture—and you have *extra values without extra cost*. By this efficient *double extrusion* method, steel qualities are actually *improved*. With modern heat treatment added, Cleveland Socket Screws are *extra tough*. And the true hex sockets, formed in one operation, are clean all the way to the bottom with sharp corners that give firm purchase to the key. It pays you to specify and buy Cleveland Socket Head Screws.

CLEVELAND *Top Quality* **FASTENERS**

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street, Cleveland 4, Ohio

Wholesalers: Chicago • Philadelphia • New York • Providence

originators of the Kaufman **DOUBLE EXTRUSION** **Process**

Ask your jobber for Cleveland Fasteners

The Road Ahead

Continued

Large part of all basic resources
"unharvested" in processing. . . .
New low cost methods would help.

main undiscovered in the United States, so diligent has been the search. However, geologists infer that, hidden under a mantle of younger rocks, ore deposits exist as large and as rich as have previously been found in the exposed areas. How soon there would be economical methods and equipment to explore and mine the basement rocks is another matter. Meanwhile, we must improve geophysical and geochemical prospecting methods that are at present in slow development before we can hope to make significant new discoveries of hidden ore bodies.

Fuller use indicated

Fuller Use of Known Resources.

In mining minerals we still leave an astounding fraction in the ground and in using mined or harvested materials we frequently throw away large quantities. About 50 pct of the commercial grades of coal, and more than 50 pct of the petroleum in an average pool are left behind in the process of production. Roughly one out of every 10 pounds of copper in ores is thrown on the tailings heap; more sulfur is blown from the smokestacks of industry than is consumed; enough natural gas was wasted in 1950 to supply the gas needs of 11 million of the nation's homes. A considerable fraction of

Turn to Page 314



"Better report that one to The Iron Age.
That's unique for working in the rain."

Hyde Park ROLLS

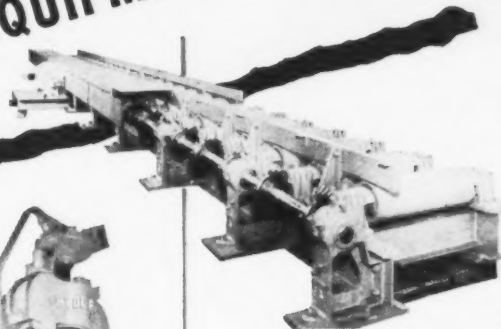
and
ROLLING MILL
EQUIPMENT



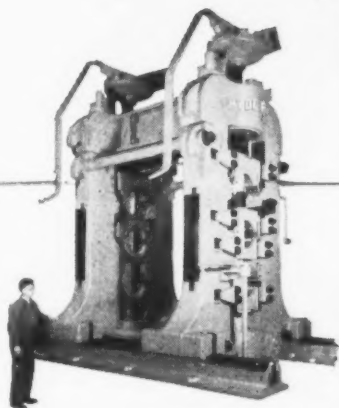
In many mills throughout the country Hyde Park Red Circle Rolls are daily giving top production, and achieving new endurance records.

The Hyde Park Red Circle is your assurance of quality and dependability. You will find it on the type and size of roll that will best serve your purpose.

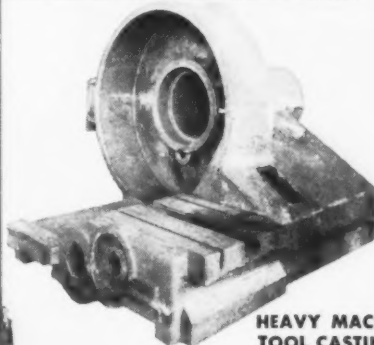
The same integrity of design and rugged construction are characteristic of all Hyde Park Rolling Mill Equipment.



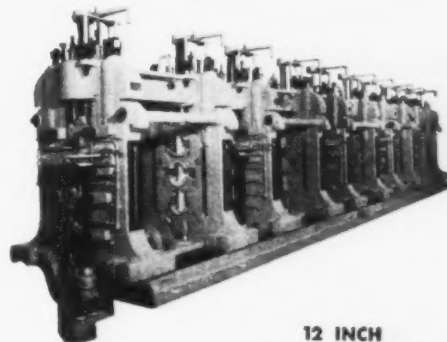
ROLLER TABLE



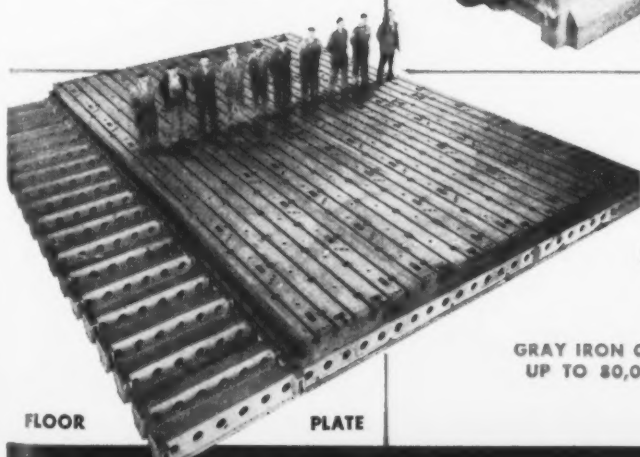
24 INCH
3 HIGH BAR MILL



HEAVY MACHINE
TOOL CASTING



12 INCH
3 HIGH BAR MILLS



FLOOR

PLATE

ROLLING
MILL EQUIPMENT

GRAY IRON CASTINGS
UP TO 80,000 LBS.

ROLLS • Alloy Iron • Chilled • Sand

- Bar Mills
- Merchant Mills
- Sheet and Strip Mills
- Pinion Stands
- Roller Tables
- Reduction Drives
- Machinery Castings
- Lathe Beds
- Housings
- Pinion Housings
- Stretcher Levellers
- Guillotine Shears
- Sheet Mill Shears
- Roll Lathes
- Special Machinery
- Machine Work
- Mill Housings
- Shoe Plate
- Lay-out Plates
- Surface Plates

Hyde Park

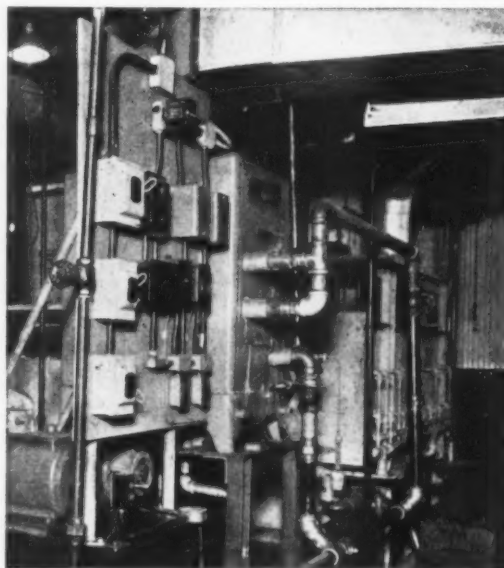
FOUNDRY & MACHINE CO.

HYDE PARK, WESTMORELAND COUNTY, PITTSBURGH DISTRICT, PA.

Improve Quenching and You Get Better Heat Treating

Your Department can have a better arrangement with
Niagara Equipment that saves much space and
increases your production.

*This quench
bath cooler
gives you
control of
temperature
and pays for
itself quickly
with
water savings*



● The NIAGARA AERO HEAT EXCHANGER transfers the heat from the quench bath to atmospheric air by evaporative cooling. It never fails to remove the heat at the rate of input, giving you real control of the quench bath temperature. This prevents flashing of oil quenches. In all cases it improves physical properties, saves loss of your product from rejections and gives you faster production, increasing your heat treating capacity. You

can put heat back into the quench bath to save the losses of a "warm-up" period.

Savings in piping, pumping and power as well as great savings in cooling water return the cost of the equipment to you in a short time. The Niagara Aero Heat Exchanger saves nearly all of the water consumed by conventional cooling methods.

For the complete story of other benefits and savings, write for Bulletin 96.

NIAGARA BLOWER COMPANY

Over 35 Years Service in Industrial Air Engineering

Dept. IA, 405 Lexington Ave.

New York 17, N. Y.

Experienced District Engineers in all Principal Cities and Canada

The Road Ahead

Continued

Virgin timber unused for lack of roads . . . Power sites await development . . . Resources mined out.

"harvested" resources also goes unused: only 65 pct of the average tree that is cut ends up as useful material; millions of tons of agricultural growth—stalks, for example—are lost every year because there is no economical way to use them.

Neglected opportunities

These physical wastes are not necessarily economic wastes, for it frequently costs more to eliminate them than the savings would be worth. But technical advances that will make it profitable to reduce these physical wastes will enormously benefit the nation's materials supply. At present, many profitable opportunities to cut physical wastes are being neglected by industrial companies whose equipment and production methods are outmoded and wasteful, or who have not explored carefully enough the potential profit in waste reduction.

Another type of neglected opportunity is exemplified by hydropower sites which remain undeveloped even though they would pay dividends, or by the virgin timber stands in the national forests of the West which have reached maximum growth but come to no use because roads have not been built to reach them. Full utilization of such resources does not await improved technology; here the missing ingredient is capital to build dams, and access roads.

Location important

Using Lower Quality Resources. The richest grade resources, if not too inconveniently located, are always the cheapest to use. For this reason civilization has always first skimmed the cream of its resources. Yet when forced, we have frequently found that today's use of the second best has advantages over yesterday's use of the best. The newsprint industry, once confined to using northern spruce, can today use a faster growing southern pine which once it could not use at all;

Turn to Page 316

cold facts . . . hot news

SEE IT IN PRODUCTION AT THE METALS SHOW

the natural gas flamatic

Now the speed, operating simplicity, and precision of Flamatic selective surface hardening can be more readily obtained than ever: Flamatic now uses natural gas — even when pressures run as low as 15 psi. Make a point to see the natural gas Flamatic — in action — producing a difficult hardness pattern on refrigerator crankshafts.

VISIT BOOTH NO. 1610: METAL SHOW, PHILADELPHIA, OCTOBER 20-24

flamatic

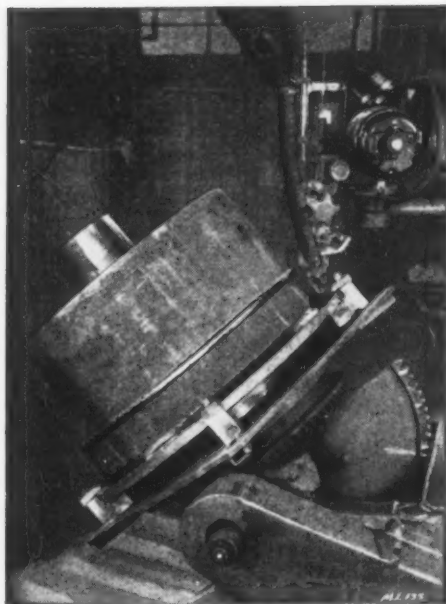
THE CINCINNATI MILLING MACHINE CO.

CINCINNATI

•
•
•
•
•
•
•

FOR QUALITY WELDMENTS

•
•
•



Send For
FREE WELDMENT BOOK



Profusely illustrated; describes the many advantages of Weldments, and Van Dorn's extensive facilities.

call in
**VAN
DORN"**

• You can be sure of outstanding quality if your weldments are produced by Van Dorn. For Van Dorn has complete fabricating facilities... experienced design engineers... specially trained workmen... 77 years' experience in metal working.

Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th St., Cleveland 4, Ohio.

—The Road Ahead—

Continued

Only third of elements find wide use in industry... Magnesium from sea water suggests new possibilities.

the plywood industry, faced with a declining supply of high-grade peeler logs, is learning to use grades which not long ago were culls. As the rich iron ores of the Mesabi approach exhaustion, we are learning to use lower grade taconites. Bauxite reserves need not limit our future aluminum output, for we already know how to make aluminum from clays of which this nation has a fabulous supply.

Renewing Renewables. The United States for generations has been "mining out" its potentially renewable resources—its forests, soil, and underground water. Restoration of severely depleted resources is a slow and costly business, if possible at all. We are learning only slowly that it pays to use such resources on a "sustained yield" basis. Maintaining productivity as a regular adjunct of planting and harvesting, or restraining withdrawals to match replacement, is far less costly in the long run than the alternative, so long practiced, of getting out the best, and moving on.

Unemployable resources

Finding Work for Presently Unemployable Resources. Perhaps the greatest increases in our usable resource base could be achieved by learning to tap fruitfully certain abundant components of our total resource base which up to now we have not known how to use.

The mix of materials we use today corresponds very little to the abundance with which these materials occur in nature. Among the ninety-odd known chemical elements only a third enter strongly into modern industry. Another third enters weakly if at all; the final third is just now beginning to step out of the textbook pages as a result of such wholly new activities as those which center in atomic energy. There is much more aluminum in the earth's crust than there is iron—yet we use 60 times as much iron as aluminum. Copper is

Turn to Page 318

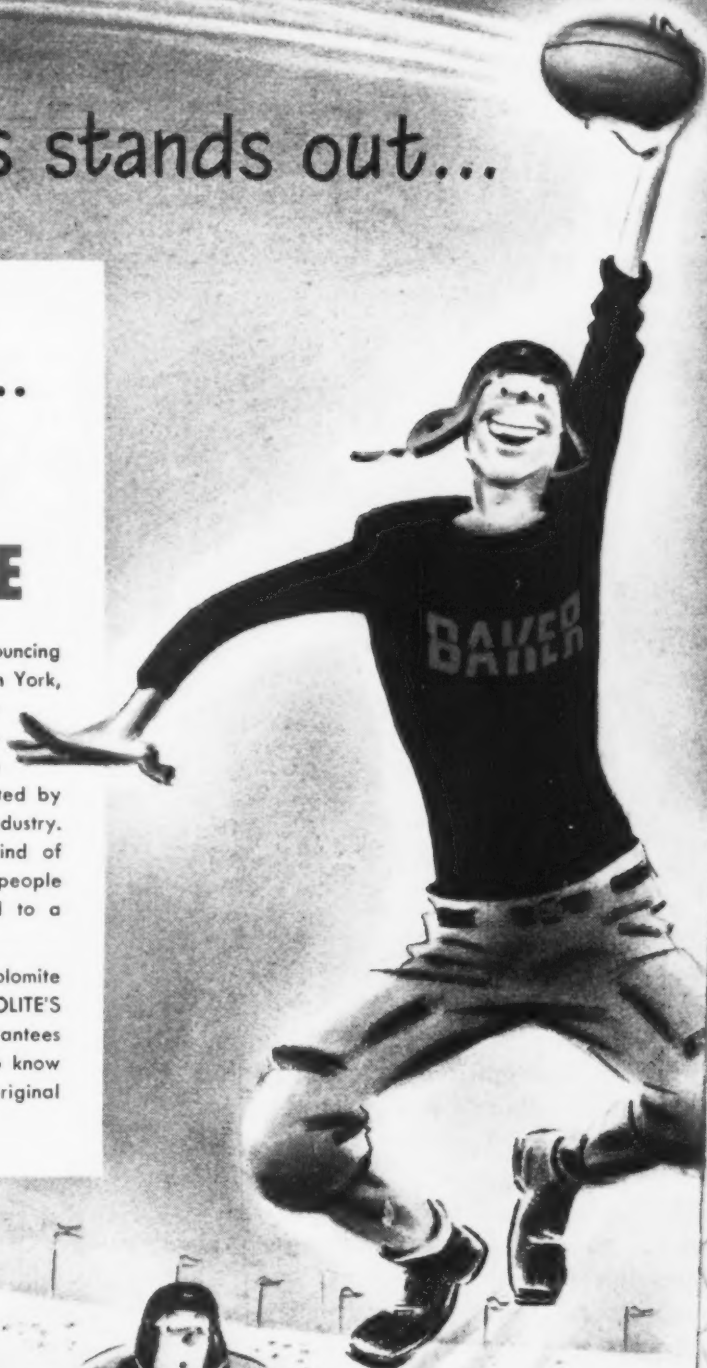
ONE always stands out...

**IN refractory
dolomites it's...**

BAKER'S MAGDOLITE

The J. E. Baker Company takes pride in announcing the completion of its new, modern plant in York, Pennsylvania. This new operation, supplementing our other plants in Eastern Pennsylvania and Ohio, will enable us to meet the increased demand for dolomite necessitated by the tremendous expansion of the steel industry. Yes, we can now assure you of the kind of dependable dolomite shipments that the people in the steel industry have needed—and to a larger area.

The superior quality of this new source of dolomite means the continuance of BAKER'S MAGDOLITE'S leadership within the industry... and guarantees top performance for you. Yes, those who know insist on BAKER'S MAGDOLITE... the original deadburned dolomite!



ALWAYS 5 WAYS BETTER — Composition • Preparation •
Strength • Economy • Quality



THE J.E. BAKER COMPANY

YORK, PENNSYLVANIA

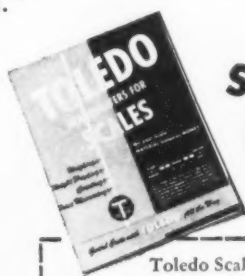
PLANTS: YORK, MILLMOYER, PENNSYLVANIA • MILLERSVILLE, OHIO

FOR THE MAN WHO WANTS NEW IDEAS TO CONTROL COSTS!



Whatever your problems in weighing, checking, testing, counting, batching, force-measuring and other weighing operations . . . there's a modern Toledo to do the job with high *accuracy*, *speed* and *dependability*. Have you checked your scale needs? Get latest information in this widely used reference on Toledos that help you guard costs . . . speed production. Look into the advantages of Printweigh in stopping losses that originate through human errors. Send coupon for new edition—"Toledo, Headquarters for Scales."


TOLEDO
HEADQUARTERS
FOR SCALES



**SEND
FOR
THIS!**

Toledo Scale Co., Toledo 1, Ohio
Please send without obligation your
new edition on modern ways to weigh
with Toledos.

Name _____
Company _____
Street _____
City _____ State _____

The Road Ahead

Continued

Versatile synthetic materials to play wider role . . . But they can not relieve basic shortages now.

next highest to iron in use yet as a metal it ranks in seventeenth place in abundance in the earth. And the most abundant metal in the earth's crust, silicon, finds as a metal almost no use at all.

Materials research

This is not to suggest that we can conform our pattern of materials use to the table of their abundance in the earth; the fact nevertheless remains that in many respects major materials research has yet to begin. If, for example, we can solve the technical problems of producing titanium metal in quantity, and of making magnesium a more acceptable metal of industry, we will have greatly strengthened our materials position. Our twentieth century industrial successes in extracting nitrogen from the air and magnesium from seawater suggest that we should seek out further ways of exploiting the ocean and atmosphere as abundant sources of materials. The heart of this problem, like so many others, is costs. A satisfactory method of producing pure oxygen from the atmosphere has existed for a long time—but the product is still too expensive for the massive industrial use to which oxygen could be put.

Synthesizing New Materials. The most notable supplements to our materials stream in recent years have been an array of new synthetics—various highly versatile plastics, artificial fibers and pharmaceuticals, synthetic rubber, and the like. These synthetic materials

Turn to Page 320



WHITTIER, CALIFORNIA

RACINE, WISCONSIN

LA PORTE, INDIANA

PADUCAH, KENTUCKY

Performance

PROVEN IN MODINE PLANTS COAST-TO-COAST... H-P-M's

Modine, one of America's leading manufacturers of heat transfer equipment, is another long-time user of H-P-M All-Hydraulic Fastraverse Presses. Yes, you'll find H-P-Ms at work in every one of the up-to-the-minute Modine plants... presses ranging from 100 to 500 tons... handling a multitude of sheet metal drawing operations. Men at Modine will tell you that for many years H-P-M presses have been playing an important part in their operation—stepping

up production...cutting costs...and maintaining rigid standards of quality. H-P-M is proud of this long association and doubly proud of the fact that the outstanding performance of H-P-M presses on a wide variety of jobs has warranted installations in all Modine plants.

Whatever your machine or production problem, you'll benefit by H-P-M's 75 years of specialized experience in the field of hydraulics. Invite us in at the planning stage, won't you?



THE HYDRAULIC PRESS MFG. COMPANY

1006 MARION ROAD

MOUNT GILEAD, OHIO, U.S.A.

Builders of Presses for the Metal Working & Processing Industries • Plastics Molding Presses • Die Casting Machines • Hydraulic Pumps, Valves & Power Units

October 9, 1952

319

Headquarters for

52100

Steel Tubing and Bars

Largest Stocks in the Country..

of this versatile steel. 52100 is hard, tough and long-wearing, yet it's easy to machine and is right for bearings, sleeves, pins, collars and many other machine parts.

Over 200 seamless tube sizes to choose from .898" O. D. to 8.250" O. D. Bar sizes from .171" round to 7.5" round. Also ring forgings in any analysis.

Write for our
Latest Stock List Now

New Headquarters of
Peterson Steels, Inc.
Union, New Jersey



PETERSON STEELS, INC.

DEPT. I, SPRINGFIELD ROAD
UNION, NEW JERSEY

Detroit, Mich. • Chicago, Ill.

The Road Ahead

Continued

Load on individual metals will vary with changes in market costs. . . . Over-designing invites waste.

may, in many cases, be superior to the article replaced, and cheaper as well. Some offer qualities unknown in older, natural materials.

Synthetics can be expected to play an expanding role in our materials stream and hopefully can relieve some of our most serious difficulties. The prospects for relief from materials shortages in the near future through the route of synthetic materials can be exaggerated, but modern science and technology, which have helped create materials shortages by expanding demand, are challenged now to help solve the materials problem in a host of ways, not least of which is by synthesizing new substances from abundant or renewable resources.

Function decides

So far, the opportunities discussed all aim at expanding the supply of materials. Similarly important opportunities exist through reducing demand and changing use. In the last analysis it is really not the individual material with which we are concerned but rather the function it performs. The essential aim is to have enough materials to perform all necessary functions at the lowest possible cost. We can shift from scarce to abundant resources; make more efficient use of materials; and recycle more as scrap.

Enlarge supply

Shifting the Load From Scarce to Abundant. As copper became scarcer in supply relative to aluminum, aluminum moved in to perform certain functions previously performed by copper. As lead became scarcer and higher priced, plastics began to supplant lead for such functions as cable covering.

These examples make it clear that our attention should be focused just as much on expanding the output and use of the abundant materials as upon enlarging the supply of scarce materials; for some purposes an extra pound of aluminum or plastics may ease the situation as

Turn to Page 322

SAVE...
...COPPER
...INVENTORIES
...SPOT WELDING COSTS



WW

KAPTRODE*

*Trade Mark

**SPOT WELDING
ELECTRODES**

The New Kaptrode Electrode with Kaptrode Shanks Adapter: This small cap type electrode inserts into semi-permanent shank, forming an assembly to fit any standard Morse taper holder of corresponding taper size.

- **COPPER SAVINGS**—75% and more with wide-spread, careful use.
- **ELECTRODE COST SAVINGS**—20% and up in ordinary shop operations; careful operators save as high as 50%.
- **INVENTORY SAVINGS**—30% and up; only small supply of shanks needed; electrodes are interchangeable; one shank outlasts ten or more tips.
- **TIME SAVINGS**—electrodes quickly, easily inserted and removed.

For the toughest electrode-consuming job in your plant, order a supply of **WW-Kaptrode Electrodes NOW!**

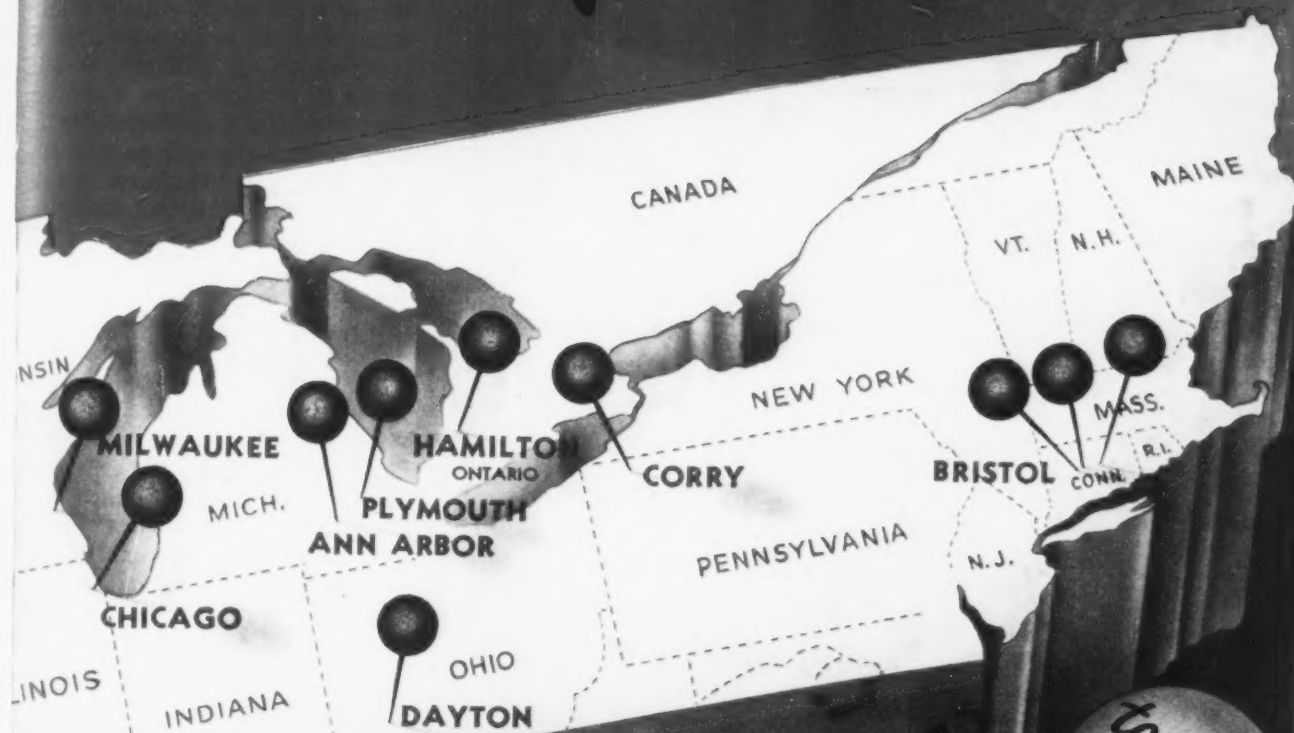
WW

22806A

WEIGER-WEED & CO., Division of Insteel Metallurgical Corp. • 11644 Cloverdale Avenue • Detroit 4, Michigan

Pin Point Service -

*in the great Spring Using Area
of America...*



**Top 10
SOURCES
for Mechanical
Springs**

**WALLACE
BARNES
COMPANY**
BRISTOL,
CONNECTICUT

**THE WILLIAM
D. GIBSON
COMPANY**
1800 CLYBOURN AVE.
CHICAGO 14,

**RAYMOND
Manufacturing
COMPANY**
Corry,
PENNSYLVANIA

**BARNES-
GIBSON -
RAYMOND**
40300 PLYMOUTH RD.
PLYMOUTH, MICH.

**B-G-R
COOK
PLANT**
ANN ARBOR
MICHIGAN

**F. N. MANROSS
AND SONS CO.**
BRISTOL
CONNECTICUT

**OHIO
DIVISION**
1712 EAST FIRST ST.
DAYTON, OHIO

**DUNBAR
BROTHERS
COMPANY**
BRISTOL, CONN.

**MILWAUKEE
DIVISION**
341 E. ERIE ST.
MILWAUKEE, WIS.

**THE WALLACE
BARNES
COMPANY LTD.**
HAMILTON, ONT.
CANADA

DIVISIONS OF
ASSOCIATED SPRING CORPORATION
AND CANADIAN AFFILIATE

SHAMVA®

MULLITE BRICK

BOOSTS PRODUCTION

Because **SHAMVA**

increases tonnage per campaign

Shamva Mullite allows higher operating temperatures and quicker heat delivery to the charge. Shortened heat time and low heat conductivity result in more tonnage per campaign.

Because **SHAMVA**

reduces shutdowns

Shamva Mullite Brick have a greater wear resistance and longer service life because of an ideal combination of physical properties.

1. High Fusion Point (3335°F.)
2. High Softening Point (Over 3000°F.)
3. Low Coefficient of Expansion (3.66×10^{-6} per °C.)
4. Anti-Spalling (No spalling A.S.T.M. test)
5. High Load Bearing Strength (0.1% A.S.T.M. test)
6. Low Heat Conductivity for greater furnace efficiency.

Remember

Mullite is the only alumina-silica refractory stable at high temperatures . . . and for mullite the buy-law is **SHAMVA**

THE MULLITE REFRACTORIES CO.

SHELTON, CONN.

The Road Ahead

Continued

Better care, corrosion prevention can save U. S. \$5.5 billion a year . . . Need better scrap reclamation.

much as another pound of copper or lead.

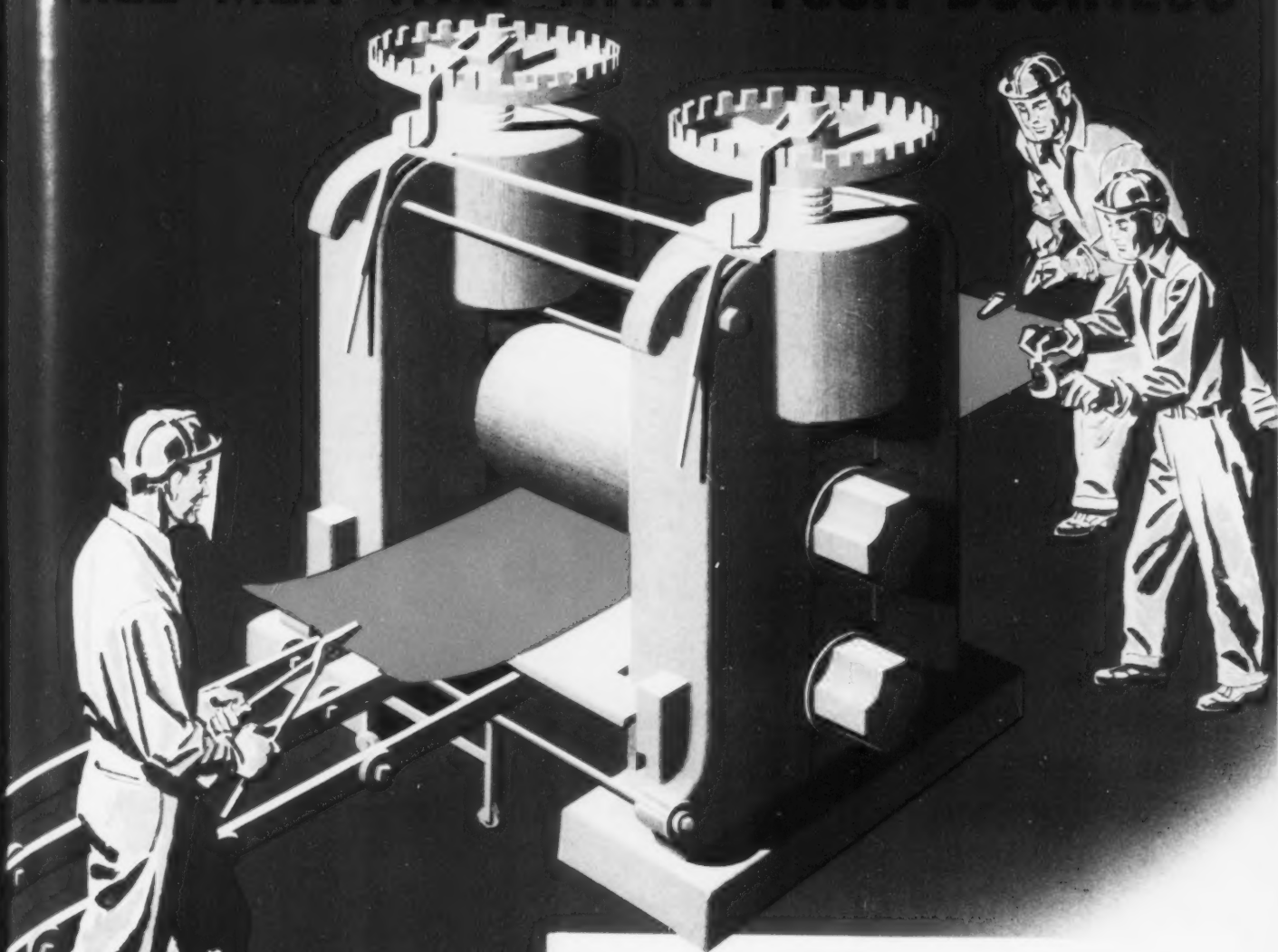
Making Materials Work Harder and Longer. The United States has been lavish in its use of materials, because of their comparative abundance in the past. We have often used two pounds of a material where one would do. Vast quantities of material have been wasted both physically and economically by "over-designing" and "over-specification." Similarly we have frequently designed products with little concern for giving them a long life or getting maximum service from the materials and labor embodied in them. Such free-handedness with materials has not been a waste so long as it satisfied various tastes for which we were willing and able to pay. We drive heavier automobiles than is necessary for mere transportation, and we adorn them with chromium because we like them that way. We blow thousands of tons of lead into the atmosphere each year from the high octane gas burned in our cars because we like quick pick-up on the road and enjoy beating the other driver at the stop light.

These lavish uses of materials stem from the choices we make when we spend our time and our money. They are valid choices in a society which places a high premium on freedom of choice. But we must become more aware that many of our production and consumption habits are extremely expensive in terms of scarce materials and that often a trivial change of taste or slight reduction in personal satisfaction can bring about tremendous savings of materials. Rising cost is probably the only factor that can cause us to reduce our use of materials in these categories.

Many articles wear out for lack of sufficient care. The atmosphere takes a terrific toll of metals inadequately protected. Estimates of losses through corrosion run as high as 5.5 billion dollars a year in the United States—in protective

Turn to Page 326

WILL MEN WHO WANT YOUR BUSINESS

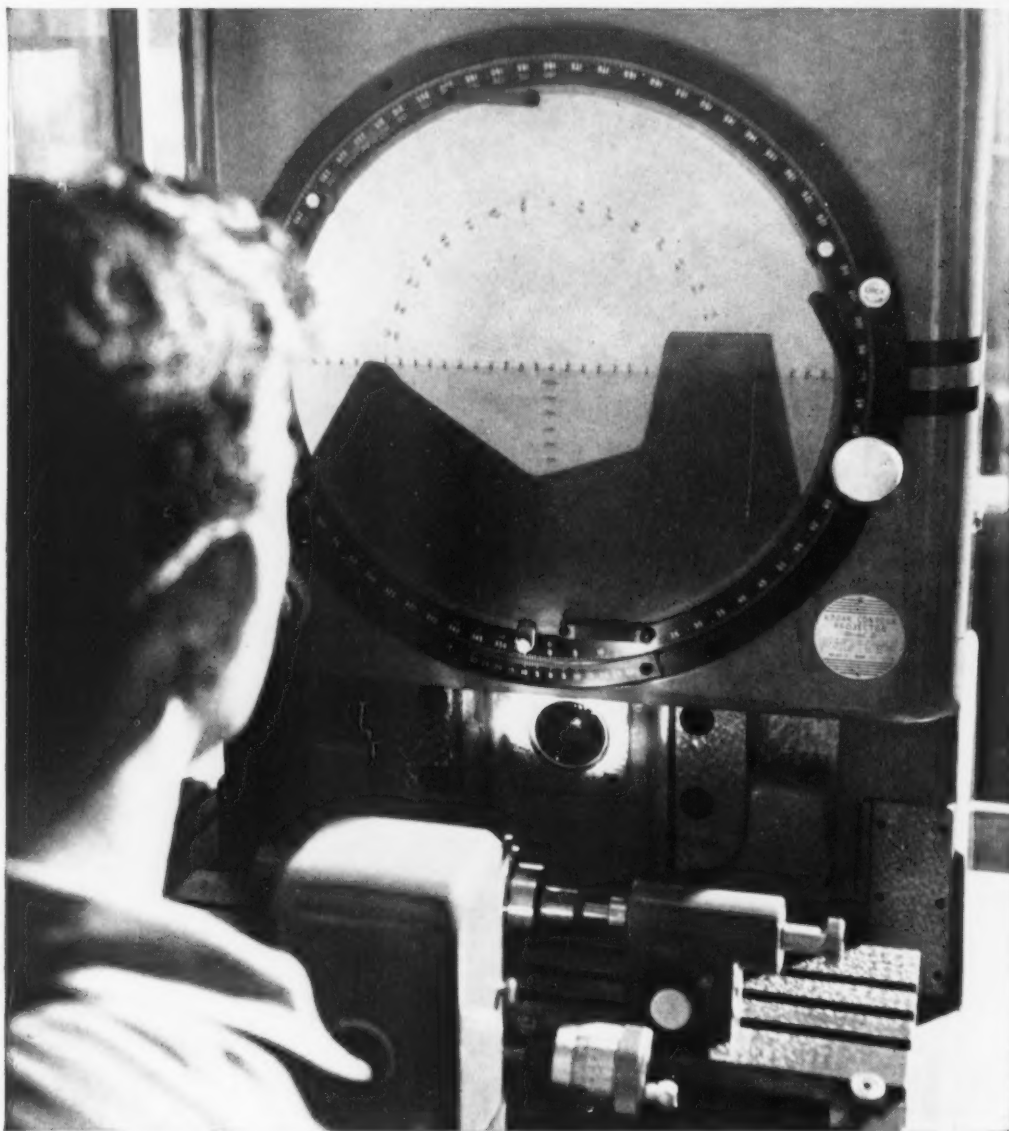


The Jessop 20-inch alloy-steel hand-mill pictured above is a very dependable piece of mechanism, and the men who attend it are highly skilled and proud of their craft. On that mill, Jessop men roll what they consider to be the best steel of its kind obtainable anywhere. It is used for a variety of purposes, from hack-saw blades to wood-working tools and metal-slitting saws to general industrial knives, and is known in the trade as high-speed sheet.

We are willing to admit that our 20-inch mill is not working as many shifts as those enthusiastic Jessop mill men would like it to work. Here's what they would like you to do. If you have any idea your company might use this type of steel, contact Jessop. You will gain, because every member of the Jessop team, including the men on this mill, will strive to bring you better steel on a better delivery schedule than you have ever known before. Please write or call.

JESSOP

STEEL COMPANY • WASHINGTON, PENNSYLVANIA



Front Row at the Raceway

TAKING STEPS to assure that the sides of bearing rings will be parallel to each other, and to the ball track, begins with proper tooling.

That's why Federal spares no pains to gage the form tools used to produce its ball bearings. Here, for example, a technician inspects contours in an optical comparator; a prism of light projects the tool outline, 20 times enlarged, onto the gridded screen. By careful inspection, he can often hold difficult tolerances to 0.0001 in. or finer.

It's by this thinking in terms of perfection, not time, that Federal produces quiet, friction-free ball bearings. Such precautions are your assurance of top performance from *every* Federal Ball Bearing. *The Federal Bearings Co., Inc., Poughkeepsie, N. Y.*



Federal

Ball Bearings

*One of America's Leading
Be'l Bearing Manufacturers*

These dependable

Bailey PRODUCTS

contribute to STEEL MILL SAFETY

Bailey

MECHANICAL VALVES

Noted for their dependable operation under all conditions, Bailey Mechanical Goggle Valves provide a tight, positive seal for shutting off gas mains in emergencies or for repairs. Requiring a minimum of maintenance, they operate by a powerful clamping force which is applied equally at all points around the disc periphery. Regardless of time between operations, they open or close instantly. Sizes from 6" to 72", totally enclosed if desired.

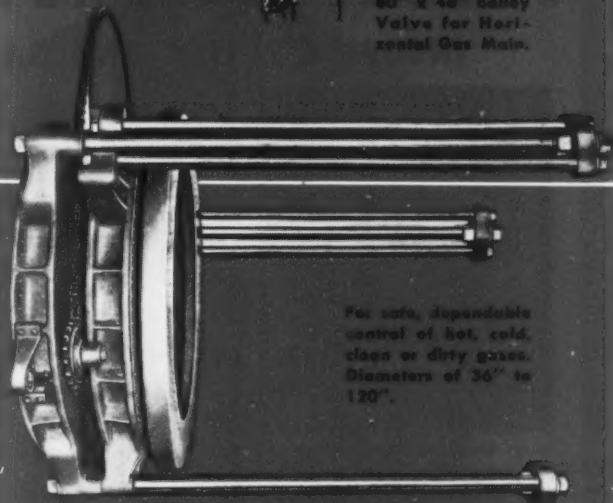


60" x 48" Bailey Valve for Horizontal Gas Main.

Bailey

THERMAL VALVES

Operated by the lineal expansion and contraction of three sets of tubes spaced around a rigid steel flange, the Bailey Thermal Valve is always safe, dependable and ready. When steam is passed through the tubes, thermal expansion creates a powerful force that instantly frees the goggle plate and permits valve operation. When the steam is removed, contraction closes the flanges against the plate, forming a tight seal. Can be operated by hand in case of steam failure.

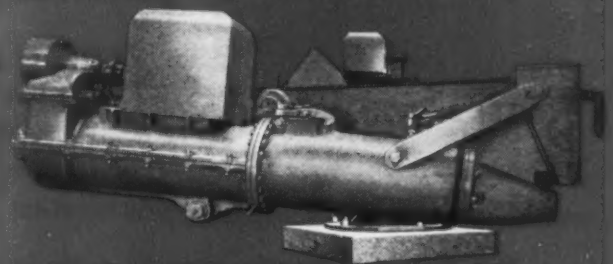


For safe, dependable control of hot, cold, clean or dirty gases. Diameters of 36" to 120".

Bailey

CLAY GUN

Powerful electric drive provides the piston pressure necessary to maintain long and uniform tapping holes. Special Bailey Lever Action forces the nose of the gun into position with positive accuracy. Piston is driven by an electric motor through reducing gears. The Bailey Clay Gun is dependable and safe.



This gun will stop the tapping hole with full wind on the furnace. Clay pressure 600 lb./sq. in.

WILLIAM B. BAILEY ENGINEERS COMPANY
LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA.



Sub-surface defects are quickly discovered with the Sperry Reflectoscope in the Grumman Aircraft Engineering Corp. plant.

SPERRY ULTRASONICS

INSURE QUALITY AND SAFETY



Large aluminum alloy forgings being tested after partial machining.



Critical areas of stress fittings being sonic tested.

Without quality there is no safety wherever metal parts are under stress. To insure the high quality of all components Grumman Aircraft Engineering Corporation uses Sperry Reflectoscopes to test raw materials and manufactured parts used in their famous planes.

The Sperry Ultrasonic Reflectoscope is the most modern non-destructive instrument for on-the-spot testing of metals for the detection of defects. Not only are many hours of machining saved but manufacturers are assured that no hidden flaws exist to cause later failure.

Practically every type of metal can be quickly and accurately inspected with the Sperry Reflectoscope. Parts may be checked without dismantling at great time saving to industry.

Write for complete descriptive information on the Sperry Day-to-Day Inspection Service or ask for particulars covering the lease or sale of the Sperry Ultrasonic Reflectoscope.



SPERRY PRODUCTS, INC.
310 SHELTER ROCK ROAD
Danbury, Connecticut
REPRESENTATIVES IN PRINCIPAL CITIES

The Road Ahead

Continued

Better recovery techniques can boost yields from scrap materials . . . Methods now haphazard.

coverings such as paints, lacquers, and varnishes, we probably spend another 1.2 billion dollars.

Annual loss high

Much scientific and engineering thought goes into the problem of corrosion prevention, and with much success here and there; yet the annual loss remains extremely high.

Giving Materials a Second Life. The more materials we embody in goods and structures the larger becomes our stockpile of potential scrap. Frequently the man-hour cost of reclaiming this material is so great that recovery does not pay, but better techniques and better organization for collecting, sorting, identifying, and reclaiming scrap can add large tonnages to our total supply of metals and other materials, and reduce the drain against primary resources. For so highly industrialized a nation, our facilities for the collection, recovery, and reclamation of once-used materials is haphazard in the extreme.

ASM GOLD MEDAL AWARD

Dr. Robert F. Mehl, head of the Dept. of Metallurgy, Carnegie Institute of Technology, Pittsburgh, will receive the 1952 American Society for Metals' Gold Medal for outstanding service in the field of metallurgy. The award will be presented Thursday, Oct. 23, at the annual ASM dinner, Benjamin Franklin Hotel, Philadelphia.

Established in 1943, the award recognizes outstanding metallurgical knowledge and exceptional ability in diagnosis and solution of diversified metallurgical problems. Dr. Mehl has been associated with Carnegie Institute of Technology for 20 years.

Turn to Page 328

**if it has to
do with**

x-ray

**it has to do
with**

PICKER
x-ray

Picker specializes in x-ray, and x-ray only, covering the field like a blanket. *Whatever you need, we've got . . .* from a simple lead letter to a 22,000,000 volt betatron. To serve you, there are sales offices and service depots in all principal cities, staffed by skilled engineers prepared to cope with any x-ray problem promptly and with understanding. If you are now using x-ray, or are wondering whether you should, you can depend on Picker for objective technical counsel and efficient handling.

PICKER X-RAY CORPORATION 25 S. Broadway, White Plains, N.Y.

SALES OFFICES AND SERVICE DEPOTS IN PRINCIPAL CITIES OF U.S.A. AND CANADA

October 9, 1952

LEAKE *Created** Metal Stampings

* RESEARCH • DESIGN • ENGINEERING
PRODUCTION [DIE MAKING • COMPLETE PRESS ROOM • MACHINE SHOP
HEAT TREATING • ALL TYPES BRAZING AND WELDING
TESTING AND INSPECTION



PATENTED STAMPED ROCKER ARMS

More than twelve distinct types have been developed by the Leake organization, customer approved, and adopted for overhead valve engines (gasoline and diesel) in such applications as automotive, aircraft, agricultural, and industrial equipment.

28 PAGES.. 32 ILLUSTRATIONS

—of creative metal stampings produced by modern Leake techniques. Single copies FREE when requested on your letterhead. Quantities at nominal cost.



Look to **LEAKE** for *unusual* metal stampings!

THE LEAKE STAMPING COMPANY
MONROE, MICHIGAN



List of Exhibitors

At National Metal Exposition,
Convention Hall, Philadelphia,
Oct. 20 through 24th inclusive.

Exhibitor	Booth
A.B.C. Die Casting Machine Co., Chicago	1563
Acme Mfg. Co., Detroit.....	1716
Acme Steel Co., Chicago.....	1977
Air Products, Inc., Allentown, Pa.	1662
Air Reduction Sales Co., New York ..	1623
Ajax Electric Co., Inc., Philadelphia ..	624
Ajax Electrothermic Corp., Trenton, N. J.	624
Ajax Engineering Corp., Trenton, N. J.	624
Ajusto Equipment Co., Toledo.....	1376
Allegheny Ludlum Steel Corp., Pitts- burgh	141
Allen Mfg. Co., Hartford.....	1825
Allied Chemical & Dye Corp., General Chemical Div., New York.....	1019
Allison Co., Bridgeport, Conn.....	1409
Alloy Engineering & Casting Co., Champaign, Ill.	507
Alloy Metal Wire Co., Inc., Prospect Park, Pa.	550
Alloy Rods Co., York, Pa.....	448
Alpha Metals, Inc., Jersey City, N. J.	1862
Alvey-Ferguson Co., Cincinnati.....	530
American Brake Shoe Co., New York ..	130
American Brass Co., Waterbury, Conn.	241
American Chain & Cable Co., Inc., Bridgeport, Conn.	706
American Cyanamid Co., New York ..	1344
American Cystoscope Makers, Inc., New York	242
American Gas Assn., New York.....	1601, 1910
American Gas Furnace Co., Elizabeth, N. J.	1701, 1601, 910

Turn to Page 330

THE IRON AGE

... **OVERSHADOWING ALL OTHERS**

METALS MARKET PLACE OF THE WORLD

... *the greatest*

SHOW

of its kind

under the sun...

NATIONAL METAL EXPOSITION

NATIONAL METAL CONGRESS

the big

'52

metal show

OCTOBER 20-24 • PHILADELPHIA, PA.

October 9, 1952

329

SOLVE MANPOWER PROBLEMS

with a **SHEPARD NILES** Electric HOIST



● One man replaces many — and moves more goods faster — with a Shepard Niles Electric Hoist. These sturdy hoists free valuable floor space, put waste ceiling area to work, enable an older man, woman or youth to handle heaviest loads with ease.

Learn how a Shepard Niles Hoist — in light, medium or heavy capacity — fits into your production picture. Call in the Shepard Niles representative — he'll make sure you get the right capacity and controls for your handling job.

TWO FAMOUS HOISTS

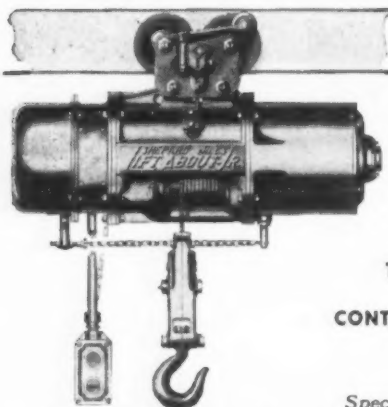
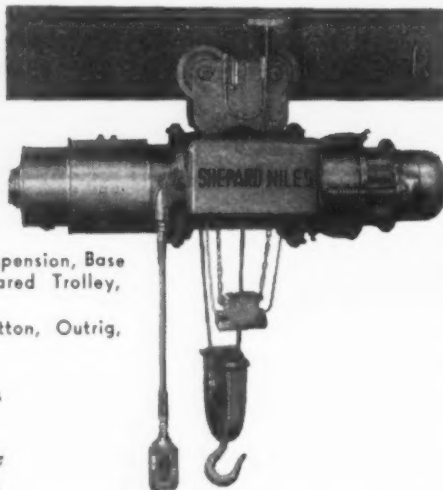
Heavy-Duty SHEPARD NILES Hoist

TYPES: Lug Suspension, Hook Suspension, Base Type, Push Trolley, Geared Trolley, Motor-driven Trolley

CONTROLS: Pendant Rope, Push Button, Outrig, Remote

CAPACITIES: 500 to 40,000 lbs.

SPEEDS: To meet your requirements
Write for Bulletin 127



LIGHT SERVICE, LOW COST

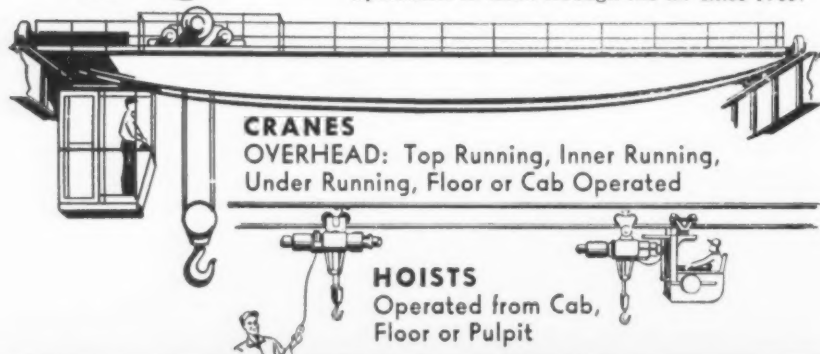
LIFTABOUT JR.

TYPES: Lug Suspension, Hook Suspension, Push Trolley

CONTROLS: Single Speed, Push Button, Rope Control

Write for Bulletin 171

Specialists in loads through-the-air since 1903.



CRANES

OVERHEAD: Top Running, Inner Running, Under Running, Floor or Cab Operated

HOISTS

Operated from Cab, Floor or Pulpit

SHEPARD NILES

CRANE AND HOIST CORPORATION

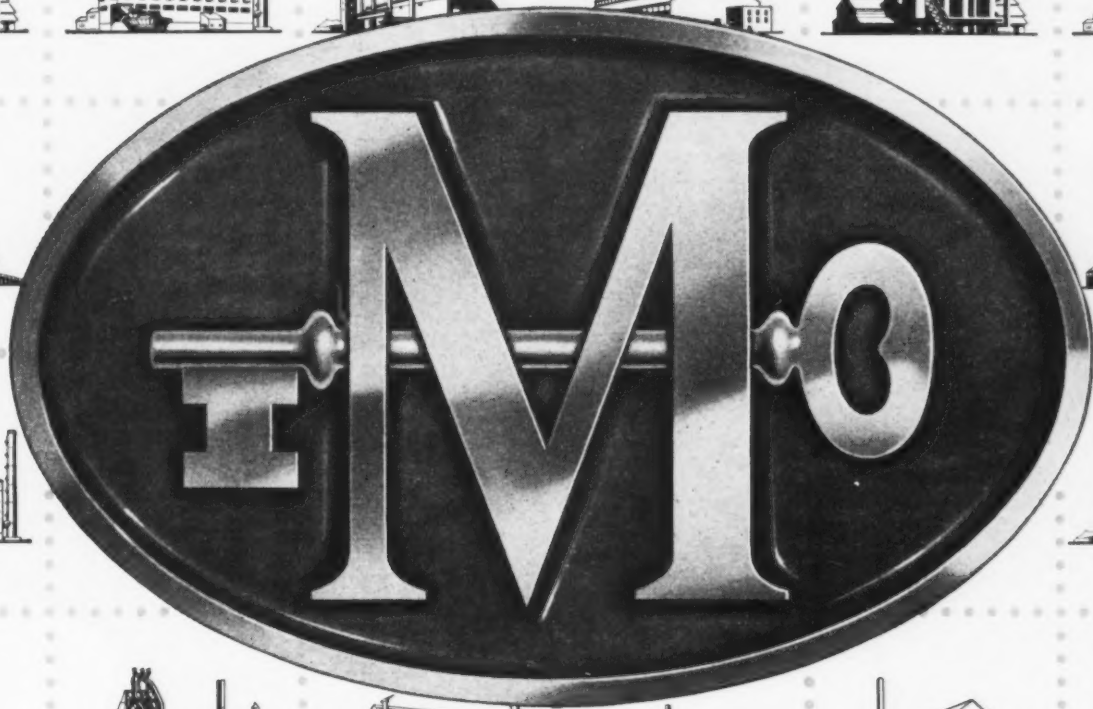
1417 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

Exhibitors

Continued

Exhibitor	Booth
American Machine & Foundry Co., New York	1124
American Machine & Metals, Inc., East Moline, Ill.	1239
American Manganese Steel Div., American Brake Shoe Co., New York	130
American Metaseal Corp., West New York, N. J.	1138
American Nickeloid Co., Peru, Ill.	1378
American Non-Gran Bronze Co., Berwyn, Pa.	1946
American Optical Co., Instrument Div., Buffalo	442
American Platinum Works, Newark, N. J.	1972
American Pullmax Co., Inc., Chicago	1449
American Silver Co., Inc., Flushing, N. Y.	709
American Society for Metals, Cleveland	1619
American Wheelabrator & Equipment Corp., Mishawaka, Ind.	1749
Ampco Metal, Inc., Milwaukee	1217
Amplex Mfg. Co., Detroit	1954
Anso Div., General Aniline & Film Corp., Binghamton, N. Y.	929
Applied Research Laboratories, Montrose, Calif.	1757
Arcair Co., Bremerton, Wash.	1132
Arcos Corp., Philadelphia	309
Aronson Machine Co., Arcade, N. Y.	718
Arwood Precision Casting Corp., Brooklyn	1758
Atlas Press Co., Kalamazoo, Mich.	602
Atomic Energy of Canada, Ltd.	1479
Automatic Temperature Control Co., Inc., Philadelphia	1768
Automotive Industries, Philadelphia	1468
Avon Tube Div., Higbie Mfg. Co., Rochester, Mch.	1961
Babcock & Wilcox Co., New York	340
Baird Associates, Inc., Cambridge, Mass.	416
Baker & Co., Inc., Newark, N. J.	1210
Baldwin-Lima-Hamilton Corp., Eddystone, Pa.	1520
Barber-Colman Co., Rockford, Ill.	641
Bausch & Lomb Optical Co., Rochester, N. Y.	405
Dell & Gossett Co., Morton Grove, Ill.	1772
Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio	1710
Beryllium Corp., Reading, Pa.	1539
Black Drill Co., Cleveland	1350
Blackstone Mfg. Co., Inc., Chicago	1382
G. S. Blakeslee & Co., Industrial Sales, Div., Chicago	540

Turn to Page 332



The Mark of Sound Engineering ...

FOR
BLAST FURNACES
SINTERING PLANTS
OPEN HEARTH SHOPS
ROLLING MILLS

THIS is the mark of McKee engineering. To steel men all over the world it means sound plant design and thorough, efficient engineering and construction. McKee experience covers almost half a century of design and construction of all types of iron and steel plants and auxiliary equipment including sintering plants and other ore preparation facilities. McKee services are backed by an organization with the scope and resources to undertake your project and fulfill the promise that *McKee Engineering means assured results.*

**DESIGN, ENGINEERING AND CONSTRUCTION FOR THE
 IRON AND STEEL AND PETROLEUM REFINING INDUSTRIES**

McKee
Engineering

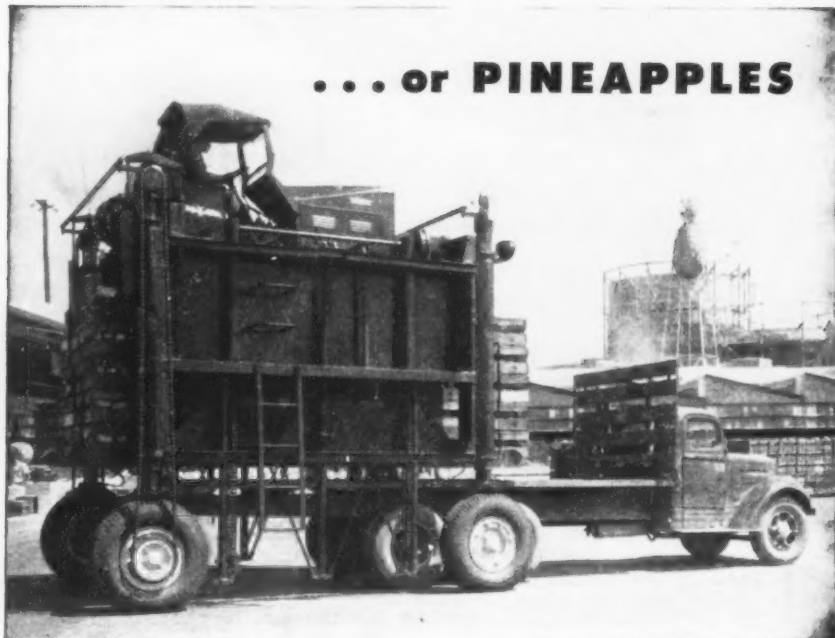
Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio.
New York Office: 30 Rockefeller Plaza, New York 20, N.Y. • *Washington Office:*
 1507 M Street, N. W. Washington, D. C. • *England:* The Iron and Steel Division
 of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd.
District Engineering Offices: Union, New Jersey and Tulsa, Oklahoma.

**Maybe your business isn't
LUMBER...**



... or PINEAPPLES



BUT... just imagine the savings you could make, the problems you could solve by handling your materials with ROSS Straddle Carriers, the most flexible and most adaptable mass material handling method known!

ROSS engineers will be glad to work with your materials handling men in exploring the possibilities of ROSS Straddle Carriers for your operations... there's no obligation.

Send for details on ROSS Straddle Carriers... 10,000 lb., 20,000 lb., 35,000 and 45,000 lb. capacities.



THE ROSS CARRIER COMPANY
Direct Factory Branches and Distributors throughout the world.
Miller St., Benton Harbor, Michigan, USA

Exhibitors

Continued

Exhibitor	Booth
Bowser, Inc., Fort Wayne, Ind.....	1658
Brainard Steel Div., Sharon Steel Corp., Warren, Ohio	660
Bridgeport Brass Co., Bridgeport, Conn.	1035
Charles Bruning Co., Inc., Chicago ..	1440
Brush Development Co., Instrument Div., Cleveland	1358
Buck Tool Co., Kalamazoo, Mich.....	905
Buehler, Ltd., Chicago	208
Bundy Tubing Co., Detroit.....	1839
Cam-Lok Div., Empire Products, Inc., Cincinnati	1116
Campbell Machine Div., American Chain & Cable Co., Inc., Bridgeport, Conn.	706
Carboloy Div., General Electric Co., Detroit	816
J. A. Carlin Co., Inc., Bala-Cynwyd, Pa.	1310
Carpenter Steel Co., Reading, Pa....	350
Castings Engineers, Inc., Chicago....	805
Challenge Machinery Co., Grand Haven, Mich.	932
Chase Brass & Copper Co., Waterbury, Conn.	1220
Chem-Fin Corp., Lansdale, Pa.	1730
Chicago Metal Hose Corp., Maywood, Ill.	534
Chicago Rivet & Machine Co., Bellwood, Ill.	1819
Chicago Tool & Engineering Co., Chicago	1023
Chilton Co., Inc., Philadelphia.....	1468

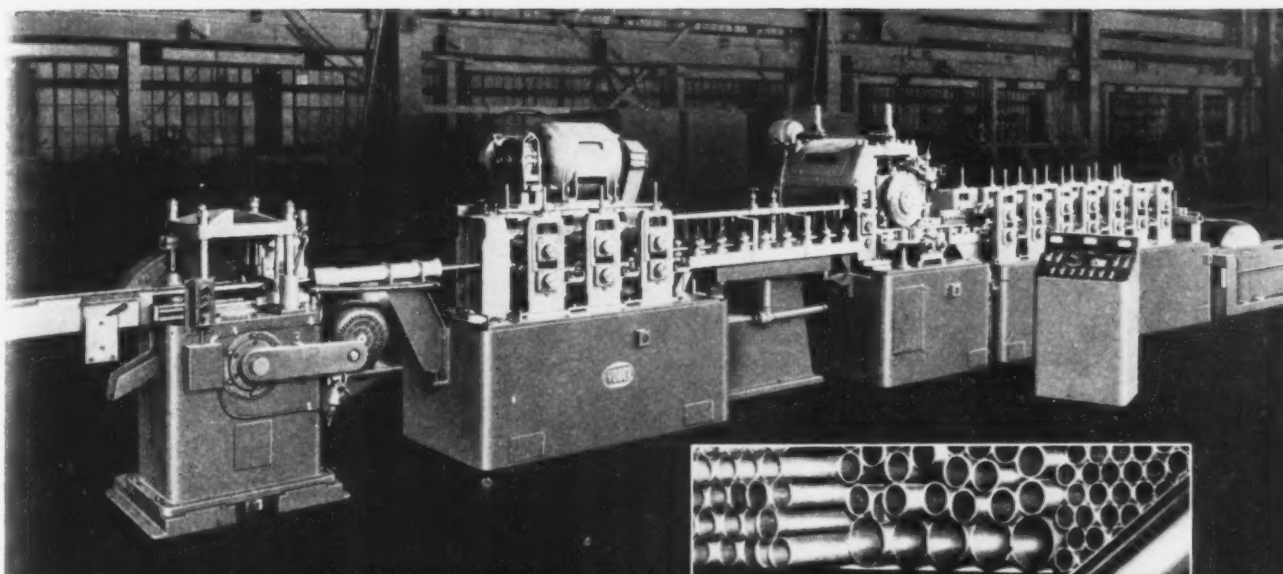
Three Win \$2000

During the week of the Metal Show the American Society for Metals will award three cash prizes of \$2000 each for the best metallurgical engineering teaching during 1951-1952.

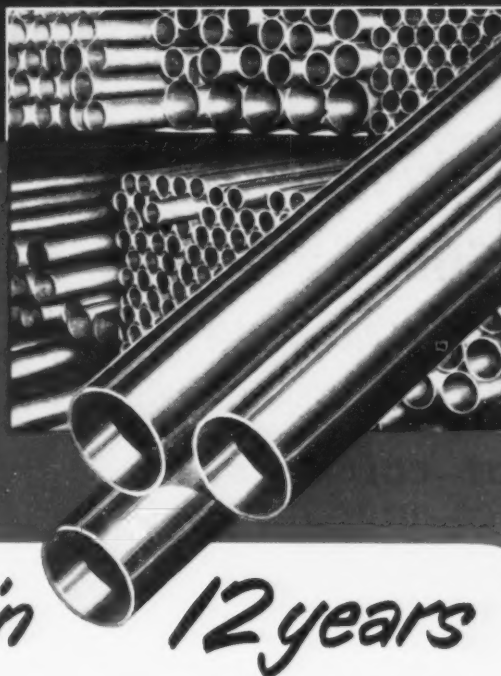
The winners are: Professors Arthur A. Burr, Rensselaer Polytechnic Institute; Joseph W. Spretnak, Ohio State University, and Robert D. Stout, Lehigh University.

Chrysler Corp., Detroit	1954
Cincinnati Milling Machine Co., Cincinnati	1610
Cities Service Oil Co., New York....	1319
Climax Molybdenum Co., New York..	55
Clinton Machine Co., Warner Div., Detroit	610

(Turn to Page 334)



Electric Weld Pipe and Tube Mills



1300% Increase in 12 years

In the brief period of twelve years, from 1938 to 1950, the manufacture of electric welded pipe and tubing in the U. S. A. grew nearly 1300%, becoming one of the child prodigies of the American metal working industries.

The beginning of this development was sparked by the introduction of the revolutionary new Yoder electric resistance welder, and followed by many other Yoder improvements in cold process pipe and tube making equipment. The latest of these is the highly efficient Yoder 4-in-1 cross type transformer.

Year by year, Yoder has built, installed and serv-

iced more electric-weld tube mills than all other builders combined. The experience so gained has been invaluable in bringing Yoder mills to their present state of pre-eminence.

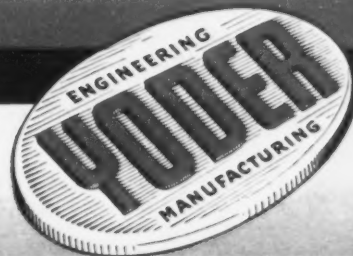
Most significant is the fact that the demand for electric welded pipe and tubes has expanded faster than the supply.

If you have been thinking of making any grade or grades of pipe and tubing, from steel or non-ferrous metals, in sizes from 1/4" up to 30 or 40-inch diameter, Yoder literature, information and recommendations are yours for the asking.

THE YODER COMPANY • 5510 Walworth Avenue, Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding





Markal
Paintstiks!
A COMPLETE LINE
for marking
all Types of Surfaces

**HOT—COLD—DRY—WET
OILY—ROUGH—SMOOTH**

**metal . . . glass . . . plastic
wood . . . ceramic . . .
fibre board**

You name the material, the surfaces and the conditions under which they are to be marked and you'll find a Markal Paintstik that will efficiently do the job. In those rare cases where conditions are out of the ordinary and no stock Paintstik is available, one will be developed to meet your needs.

Markal Paintstiks are a quality product that produce permanent markings—made especially to meet the needs and special conditions of industry.

Write today for an easy selector chart, then order Paintstiks from your nearest jobber. If he should not have them write direct to the address below.

Markal COMPANY

**THE MARK OF QUALITY
MARKAL PAINTSTIKS**

3088 WEST CARROLL AVENUE, CHICAGO 12, ILLINOIS

Exhibitors

Continued

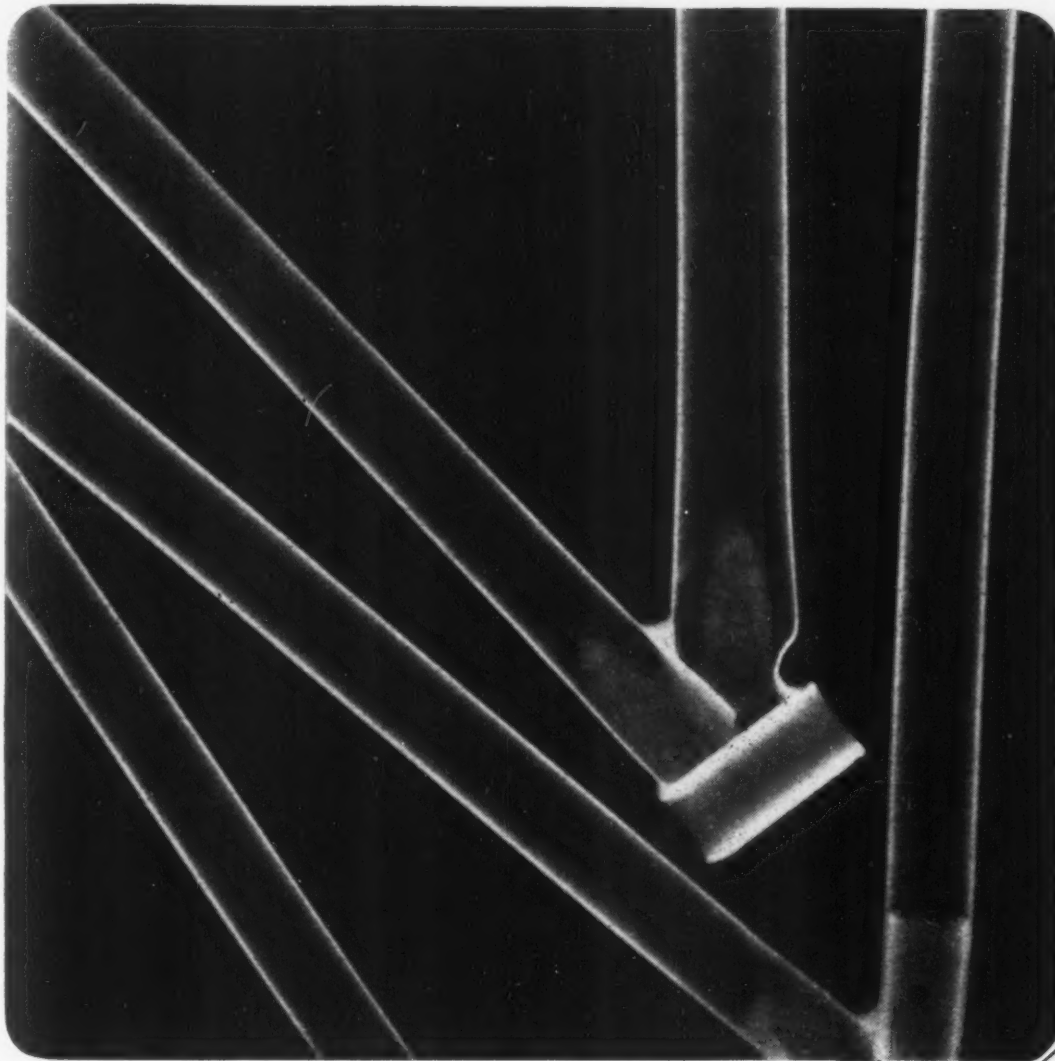
Exhibitor	Booth
Coles Cranes, Inc., Joliet, Ill.	1369
Collins Micro-Flat Co., Los Angeles . . .	1281
Commander Mfg. Co., Chicago	531
Commercial Shearing & Stamping Co., Youngstown	1616
Continental Industrial Engineers, Inc., Chicago	1601, 1910
Continental Tooling Service, Inc., Dayton	1027
Cooper Metallurgical Laboratories, Cleveland	923
Crane Packing Co., Chicago	811
Crucible Steel Co. of America, New York	104
Curtis Machine Div., Lincoln Park In- dustries, Inc., Jamestown, N. Y.	937
Dake Engine Co., Grand Haven, Mich.	1761
Deepfreeze Distributing Corp., Sub Zero Products Mfg. Div., Cincinnati . . .	1320
Delaware Tool Steel Corp., Wilming- ton, Del.	1275
Delta Power Tool Div., Rockwell Mfg. Co., Milwaukee	1650
A. P. De Sanno & Son, Machinery Div., Phoenixville, Pa.	1252
Detrex Corp., Detroit	1849
DeWalt, Inc., Lancaster, Pa.	1120
Diamond Iron Works, Inc., Minne- apolis	1557

Turn to Page 336



"I always make this my last stop."

Radiography checks —



then double checks

LANDING GEAR STRUTS lead a life of punishment. Though light, they must be strong. Their joints must be sound. Radiography is the method used to prove them sound.

A maker of amphibian aircraft goes even further. Though treated and sealed, strut members can develop internal corrosion and become weakened. Radiography alone can provide the required non-destructive examination of these internal surfaces. So it has become routine to x-ray these struts as part of the periodic inspection of the planes.

This is but one example of how radiography is proving a boon to the welding process. It is helping to open new fields for the use of welding—especially in the fabrication of highly stressed products and assemblies.

Look into the ways Radiography can aid your business. Your x-ray dealer will be glad to give you full information and assistance.

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography —

another important function of photography



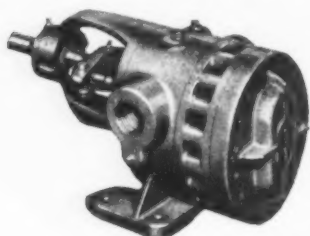
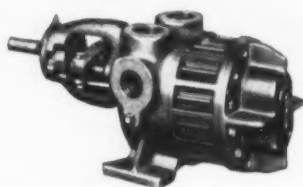
Pumps

FOR MANUFACTURING PETROLEUM, MARINE AND PROCESS INDUSTRIES

MODELS FROM 3/4 TO 300 G.P.M. — CAPACITIES TO 1000 P.S.I.
SPEEDS UP TO 1800 R.P.M. FOR PUMPING CLEAN LIQUIDS

SERIES F

Four-port design offers 8 optional piping arrangements. Equal size helical gears run in axial hydraulic balance. Standard or bronze fitted; packed box or mechanical seal. Up to 300 P.S.I.—1 to 300 G.P.M. for clean liquids.

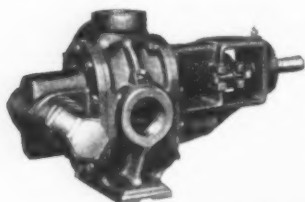
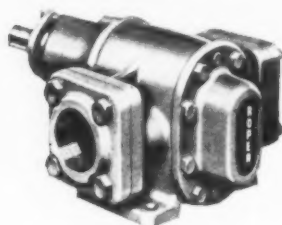


SERIES H

Widely used for hydraulic mechanisms and other applications where high pressures are required. Spur gears provide high volumetric efficiency. Packed box or mechanical seal. Pressures to 1000 P.S.I. — 5 to 75 G.P.M. sizes.

SERIES K

For hydraulic service, fuel transfer or fuel supply. Features helical gears and exclusive Venturi suction and discharge principle in 10 through 50 G.P.M. sizes. Packed box or mechanical seal. 150 P.S.I. — 3 4 to 50 G.P.M.



SERIES 3600

For general purpose work handling thin or thick liquids with suction lift up to 15 feet. Standard or bronze fitted; with or without built-in relief valve. Pressures to 60 P.S.I. — 40 to 300 G.P.M.



GEO. D. ROPER CORPORATION
110 Blackhawk Park Ave.
Rockford, Illinois

ROPER
Rotary Pumps

Exhibitors

Continued

Exhibitor	Booth
Distillation Products Industries, Rochester, N. Y.	1428
Diversey Corp., Chicago	646
Diversified Metal Products Co., Los Angeles	1767
DoAll Co., Des Plaines, Ill.	524
Dow Chemical Co., Midland, Mich.	730
Dow Furnace Co., Detroit	1315
Drever Co., Philadelphia	1980
Wilbur B. Driver Co., Newark, N. J.	521
Driver-Harris Co., Harrison, N. J.	1919
East Shore Machine Co., Cleveland ..	1455
Eaton Mfg. Co., Reliance Div., Massillon, Ohio	912



"Don't look now, but he's slept here all week."

Eclipse Fuel Engineering Co., Rockford, Ill.	1926, 1601, 1910
Ekstrand & Tholand, Inc., New York ..	1567
Elastic Stop Nut Corp. of America, Union, N. J.	640
Eldorado Mining & Refining, Ltd., Commercial Prods. Div., Ottawa, Ont.	1479
Electric Furnace Co., Salem, Ohio ...	341
Electro-Alloys Div., American Brake Shoe Co., Elyria, Ohio	130
Electro Arc Mfg. Co., Ann Arbor, Mich.	1778
Elox Corp. of Michigan, Clawson, Mich.	1355
Empire Products, Inc., Cincinnati ...	1116
Engineered Castings Div., American Brake Shoe Co., Rochester, N. Y.	110
Enthone, Inc., New Haven, Conn.	1857
Ercona Corp., Scientific Instrument Div., New York	910
Erico Products, Inc., Cleveland	1452
Iver J. Esbenson Co., Denver	916

Turn to Page 338

Work heavy, bulky, hard to move?

Bring the tool to the work...

with **Black & Decker Sanders and Grinders!**



B&D SANDERS

drive attachments for sanding metal and wood; grinding down welds and casting ridges; cleaning ceilings, structural steel, tanks, boilers, vats, sheet metal and soldered joints. 7" and 9" disc diam.

B&D PORTABLE GRINDERS

prepare surfaces for welding; smooth welds, snag and grind castings; remove rust, scale, old paint; cut off old rivets, studs, bolts; grind, clean and buff frames, cabinets, etc. 5" and 6" wheel diam.

They're powerful and portable!

NO MATTER how big or bulky your abrasive jobs, you'll cut costs and speed up work when you switch from hand methods to Black & Decker power! B&D Sanders drive abrasive discs, saucer grinding wheels, "Whirlwind" wire cup brushes, gouging and planing heads. B&D Portable Grinders drive grinding wheels, "Whirlwind" wire wheel brushes, cotton buffing wheels. And *both* give you: (1) Dependable, full-powered motors tailor-made by Black & Decker for the tools they drive; (2) Perfect balance for easy handling, less operator fatigue; (3) Tough, longer-lasting parts for extra years of service, lower tooling costs!

See your nearby B&D Distributor for demonstra-

tions, expert help on any tooling problem.

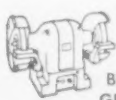
Write for free catalog of over 100 Electric Tools to: THE BLACK & DECKER MFG. Co., 603 Pennsylvania Ave., Towson 4, Maryland.



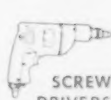
DRILLS



ELECTRIC HAMMERS



BENCH GRINDERS



SCREW DRIVERS



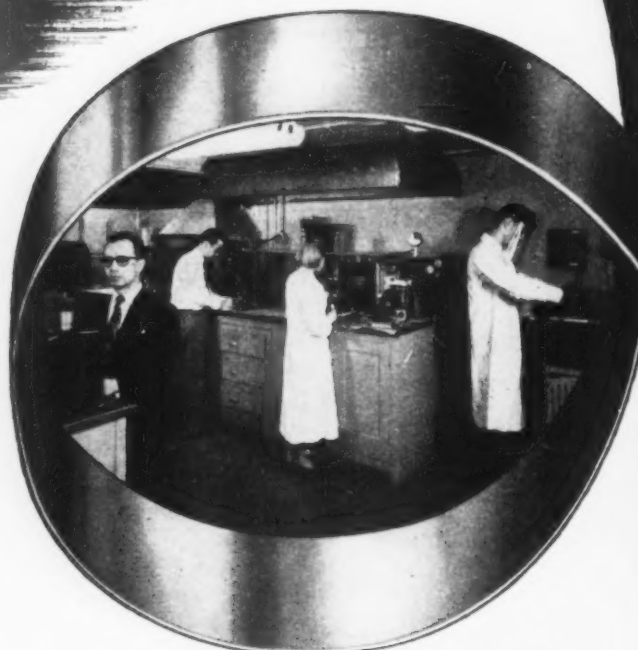
SAWS



PORTO-SHEARS

**UNIFORM
HIGH QUALITY**

Demands



Trained Personnel

In recent years, automatic machines have been developed to a point where it is sometimes said they can "almost think". However — despite this mechanical progress, there is still no satisfactory substitute for trained and experienced craftsmen in manufacturing a product where uniform high quality is the primary consideration. Nowhere is this fact better realized than at Wallingford. In our production departments and our research and test laboratories, craftsmen and technicians exercise their knowledge and skills to maintain the Wallingford reputation for superior quality strip and tubing.

THE
WALLINGFORD



CO.

WALLINGFORD, CONNECTICUT, U.S.A.

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS • STRIP AND TUBING

Exhibitors

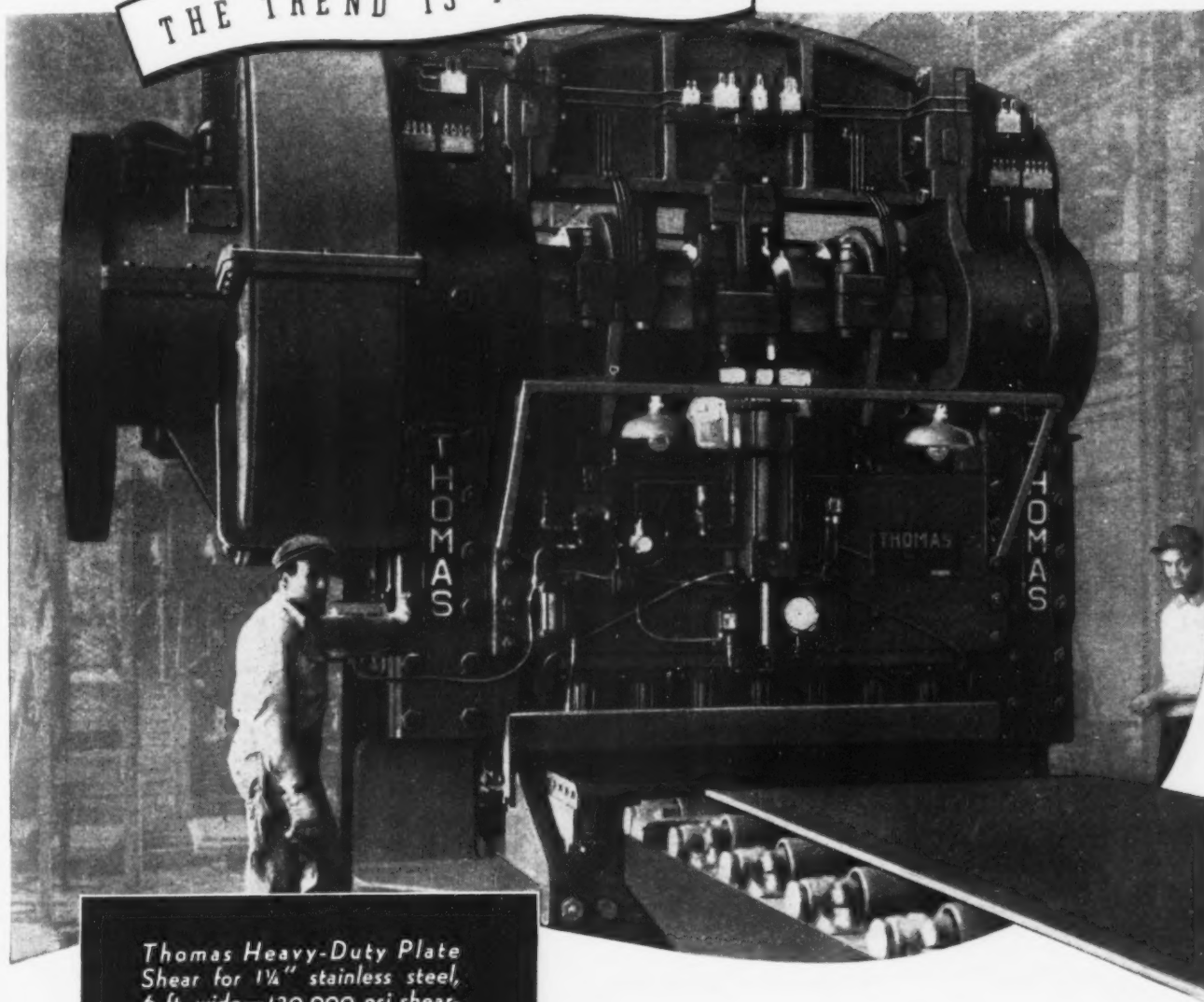
Continued

Exhibitor	Booth
Eutectic Welding Alloys Corp., Flushing, N. Y.	1001
Fahralloy Co., Harvey, Ill.	1969
Fawick Airflex Co., Inc., Cleveland ..	1960
R. Y. Ferner Co., Inc., Boston	1123
Firth Sterling Inc., Pittsburgh	421
Flexonics Corp., Maywood, Ill.	534
Fostoria Pressed Steel Corp., Fostoria, Ohio	1571
Gas Appliance Service, Inc., Chicago 1920, 1601, 1910	
Gebr Heller Maschinenfabrik, Nürtingen, Germany	1620
Gehrich & Gehrich, Inc., Woodside, N. Y.	1916, 1601, 1910
General Alloys Co., Boston	204
General Aniline & Film Corp., New York	929
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.	251
General Electric Co., X-Ray Dept., Milwaukee	1549
General Motors Corp., Rochester, New York	1031
Globe Stamping Div., Hupp Corp., Cleveland	1354
B. F. Goodrich Co., Automotive & Aviation Div., Akron, Ohio	617
Graham Corp., Ferndale, Mich.	933
Gray, Inc., Minneapolis	924
Gray Iron Founders' Society, Inc., Cleveland	1340
Gregory Industries, Inc., Lorain, Ohio ..	1850
Griffith-Raguse & Co., Inc., Philadelphia	1310
Gulf Oil Corp., Pittsburgh	1515
H & H Tube & Mfg. Co., Detroit	1487
H P L Mfg. Co., Cleveland	1951
William J. Hacker & Co., Inc., New York	1279
Hammond Machinery Builders, Inc., Kalamazoo, Mich.	1130
Handy & Herman, New York	110
Harnischfeger Corp., Milwaukee	1525
Harper Electric Furnace Corp., Buffalo ..	1857
Harshaw Chemical Co., Cleveland ...	1420
C. I. Hayes, Inc., Providence	1262
Haynes Stellite Div., Union Carbide & Carbon Corp., Kokomo, Ind.	1202
Heath Engineering Co., Fort Collins, Colo.	916
Heintz Mfg. Co., Philadelphia	1668
Heli-Coil Corp., Danbury, Conn.	1953
Heller Machine Co., New York	1620
Heppenstall Co., Pittsburgh	1572

Turn to Page 340

THOMAS *specializes* in building **HEAVY SHEARS**

THE TREND IS TO THOMAS



Thomas Heavy-Duty Plate Shear for 1½" stainless steel, 6 ft. wide—120,000 psi shearing strength. Installed in the mills of the Eastern Stainless Steel Co., Baltimore, Md.

This is another example of Thomas' ability in designing and building machines to meet specialized shearing requirements for heavy mill service!

THOMAS
MACHINE MANUFACTURING CO.

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

PITTSBURGH 23, PA.

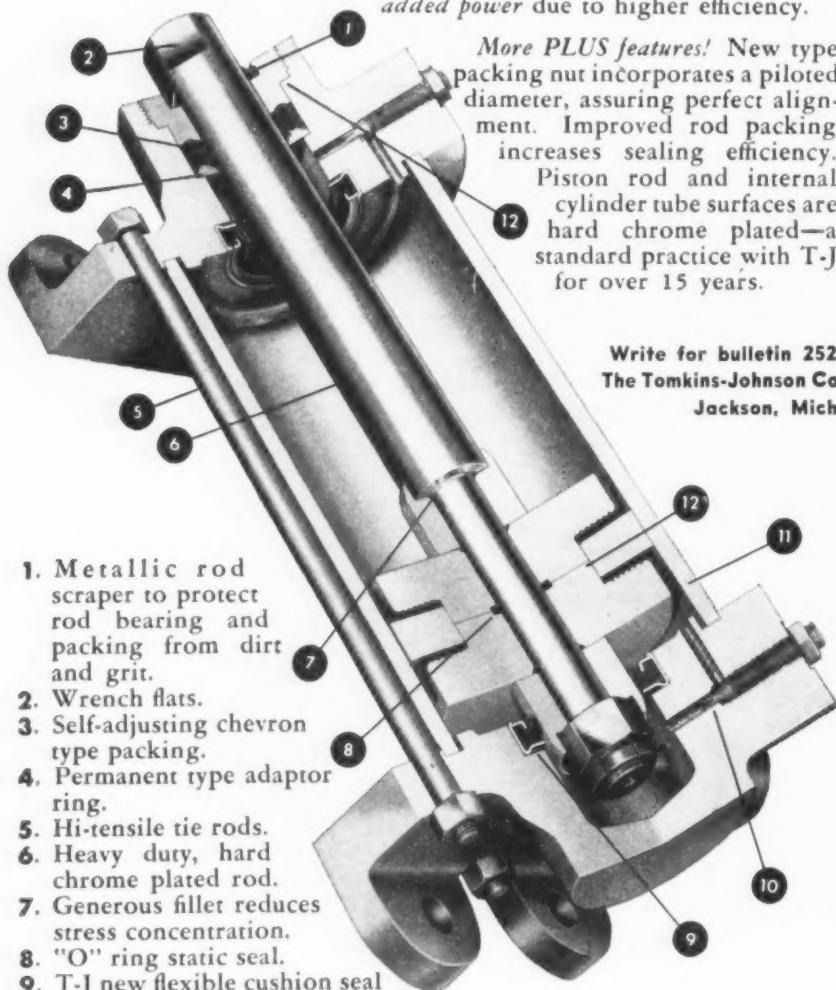
32

New Flexible Sealing...

T-J AIR CYLINDER

Designed with revolutionary application of
Super-Cushion

It's sealed with pressure—a revolutionary T-J application of flexible sealing that insures positive cushion action combined with automatic valving action for fast return stroke... eliminates binding and sticking... operates with low friction, minimum wear, and added power due to higher efficiency.



More PLUS features! New type packing nut incorporates a piloted diameter, assuring perfect alignment. Improved rod packing increases sealing efficiency. Piston rod and internal cylinder tube surfaces are hard chrome plated—a standard practice with T-J for over 15 years.

Write for bulletin 252.
The Tomkins-Johnson Co.
Jackson, Mich.

1. Metallic rod scraper to protect rod bearing and packing from dirt and grit.
2. Wrench flats.
3. Self-adjusting chevron type packing.
4. Permanent type adaptor ring.
5. Hi-tensile tie rods.
6. Heavy duty, hard chrome plated rod.
7. Generous fillet reduces stress concentration.
8. "O" ring static seal.
9. T-J new flexible cushion seal insures positive cushion with automatic valve action for fast return stroke. (Patent applied for)
10. Fine cushion adjustment.
11. Heavy wall precision honed hard chrome plate.
12. Controlled packing compression with metal to metal contact.

36 YEARS' EXPERIENCE T-J

TOMKINS-JOHNSON

RIVETORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHERS

Exhibitors

Continued

Exhibitor	Booth
Higbie Mfg. Co., Rochester, Mich...	1961
Hitchiner Mfg. Co., Inc., Milford, N. H.	817
Charles A. Hones, Inc., Baldwin, N. Y.	1912, 1601, 1910
E. F. Houghton & Co., Philadelphia...	724
Howard Foundry Co., Chicago, Ill...	501
Hupp Corp., Cleveland	1354
Illinois Testing Laboratories, Inc., Chicago	1457
Induction Heating Corp., Brooklyn...	1870
Industrial Heating Equipment Co., Detroit	1439
Industrial Tectonics, Inc., Ann Arbor Mich.	919
Institute of Industrial Launderers, Cleveland	1362
International Nickel Co., Inc., New York	230, 324
Invincible Vacuum Cleaner Mfg. Co., Dover, Ohio	1256
Ipsen Industries, Inc., Rockford, Ill...	131
Iron Age, New York	1842
Janney Cylinder Co., Philadelphia...	1327
Jarrell-Ash Co., Boston	1205
Jensen Specialties, Inc., Detroit	1415
S. C. Johnson & Son, Inc., Racine, Wis.	1119
C. Walker Jones Co., Philadelphia...	1257
K S M Products, Inc., Merchantville, N. J.	834
Kanthal Corp., Stamford, Conn.	1266
Kearney & Trecker Corp., Plainfield, N. J.	1941
Kelite Products, Inc., Los Angeles...	1260
Kelley-Koett X-Ray Corp., Covington, Ky.	1809
C. M. Kemp Mfg. Co., Baltimore, Md.	1801, 1601, 1910
Kennametal, Inc., Latrobe, Pa.....	1319
L. R. Kerns Co., Chicago.....	651
Keystone Drawn Steel Co., Spring City, Pa.	1965
Mrs. Andrew King, Ardmore, Pa....	121
Knapp Mills, Inc., Specialties Div., Wilmington, Del.	808
Kold-Hold Mfg. Co., Lansing, Mich...	1462
Latrobe Steel Co., Latrobe, Pa.....	1649
Leeds & Northrup Co., Philadelphia...	304
E. Leitz, Inc., New York	1343
Lepel High Frequency Labs, Inc., Woodside, N. Y.	1114
Lincoln Electric Co., Cleveland	140
Lincoln Park Industries, Inc., Jamestown, N. Y.	937
Lindberg Engineering Co., Chicago...	330

Turn to Page 344

Both
961
817
910
724
501
354
457
870
439
919
362
024
256
31
42
27
05
15
19
57
34
66
41
60
09
10
19
51
55
21
08
52
49
04
03
4
00
7
0
E

All copper
(or brass)
where you
need it—
—and steel
where steel
serves best

SuVeneer[®]

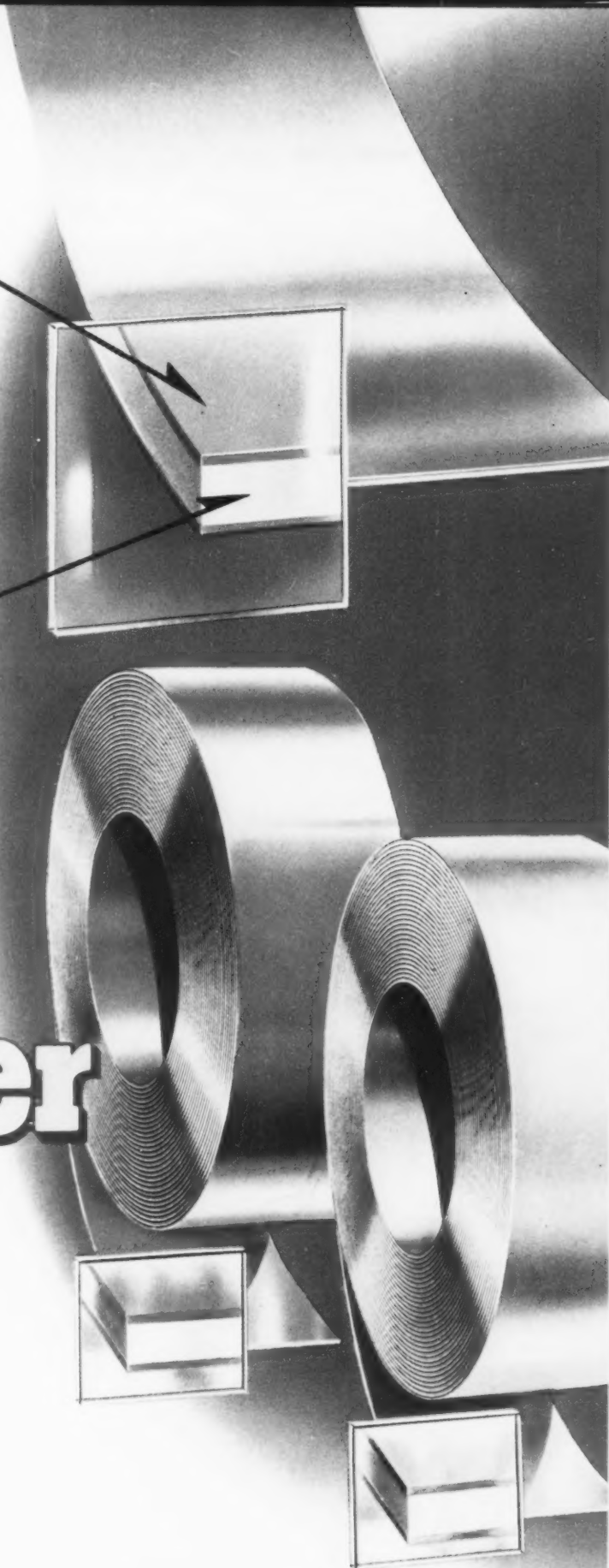
CLAD METALS

SuVeneer Clad Metals give you *sur-*
faces of genuine solid copper or brass, to
do the jobs for which you ordinarily
specify these materials . . . with the big
new plus of *steel* for greater strength,
twice the elasticity, and lighter weight,
than either copper or brass used alone.

• You save critical metals for defense—
you benefit your products' performance
—when you specify time-proved
SuVeneer Clad Metals. *Let us work
with you!*

**Superior Steel
CORPORATION**

CARNEGIE, PENNSYLVANIA



When all eyes can read the size

Assembly moves faster



good judgment calls for
PARKER-KALON®
when good design calls for
SOCKET SCREWS



Your **INDUSTRIAL SUPPLY DISTRIBUTOR**—
 your local source for P-K Socket Screws—
 works side by side with the P-K Assembly
 Engineer. Their combined efforts are
 solving many difficult problems of planning
 and procurement. Let them help you.

Some sharp-eyed mechanics are expert at estimating the size of a plain head cap screw. But *most* assembly workers, and especially learners, need the screw that puts size beyond question . . . the P-K Size-Mark Socket Head Cap Screw.

The size is clearly incised on the head, can be seen at a glance. Saves time and wasted screws when sizes get mixed up, prevents errors and spoiled work. It's a good sales feature, too, because installation and repair work on your product is simpler and easier.

Only P-K offers both Size-Mark and Gear Grip in Socket Head Cap Screws. Ask for samples. See how they save time and trouble all along the line. Parker-Kalon Corporation, 200 Varick Street, New York 14.

CHEMICAL USERS' GUIDE To General Chemical Products for the Metal Industries

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTHS	SHIPPING CONTAINERS	APPLICATIONS
Sulfuric Acid H_2SO_4	Liquid	66° Be (93.19%) 99% Oleum, 20-65%	Carboys (except Oleum) Steel Drums Tank Trucks Tank Transports Tank Cars	Pickling and descaling; electroplating; bright dipping; electrolytic polishing; galvanizing; anodizing.
Hydrochloric Acid HCl + water (Muriatic Acid)	Liquid	18° Be (27.92%) 20° Be (31.45%) 22° Be (35.21%)	Carboys Tank Trucks Tank Cars	Pickling; electroplating; bright dipping; galvanizing; tinning; etching metals; dissolving metals.
Nitric Acid HNO_3 + water	Liquid	36° Be (52.30%) 38° Be (56.52%) 40° Be (61.38%) 42° Be (67.18%) 95%	Carboys (except 95%) Drums Tank Cars	Pickling; electroplating; bright dipping; oxide finishing; dissolving and stripping metals.
Hydrofluoric Acid HF + water	Liquid	60% 70%	Steel Drums & Tank Cars	Pickling; electroplating; electrolytic polishing; bright dipping.
Sodium Fluoride NaF	White Powder	95% or 97% Light or Dense	Multiwall Paper Bags Fibre Drums	Manufacture of rimmed steel; heat treating; galvanizing; pickling; electroplating.
Sodium Bifluoride $NaHF_2$	White Powder	95% or 97% $NaF \cdot HF$	Fibre Drums	Electroplating.
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ (TSP)	Crystal	P_2O_5 —18.4%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate $Na_2SiO_3 \cdot 5H_2O$	White Granules	98.5%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5%	Multiwall Paper Bags Fibre Drums	Oxide finishing; metal cleaning.
Potassium Fluoborate KBF_4	White Powder	97.0%	Fibre Drums	Aluminum and magnesium casting; as a flux and grain refiner for aluminum; for removing magnesium from secondary aluminum alloys.
Sodium Fluoborate $NaBF_4$	White Powder	94.0%	Fibre Drums	
Ammonium Fluoborate NH_4BF_4	White Powder	96.0%	Fibre Drums	Aluminum and magnesium casting; electroplating.
Fluoboric Acid HBF_4 + water	Liquid	42.0%	Rubber Drums	Electroplating; metal cleaning or dipping; electropolishing.
Lead Fluoborate $Pb(BF_4)_2$ + water	Liquid	51.0%	Carboys	Electroplating.
Tin Fluoborate $Sn(BF_4)_2$ + water	Liquid	47.0%	Carboys	Electroplating.
Copper Fluoborate $Cu(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Iron Fluoborate $Fe(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Nickel Fluoborate $Ni(BF_4)_2$ + water	Liquid	42%	Carboys	Electroplating.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

OTHER PRODUCTS: Acetic Acid; Ammonium Thiosulfate Solution; Aqua Ammonia; Barium Fluoride; Chromium Fluoride; Copper Fluoride; Copper Sulfate; Glauber's Salt; Iron Sulfide; Nickel Fluoride; Perchloric Acid; Sodium Bisulfite, Anhydrous; Sodium Silicate; Sodium Sulfite, Anhydrous; Stannous Chloride; Tetrasodium Pyrophosphate; Phosphoric Acid; Sodium Tripolyphosphate.

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte
Chicago • Cleveland • Denver • Detroit • Greenville (Miss.) • Houston • Jacksonville • Kalamazoo
Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence • St. Louis
San Francisco • Seattle • Yakima (Wash.)

In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver



WHEN PERKINS GEARS GO IN— TROUBLE GOES OUT!

*Specify Perkins
custom-made Gears
for trouble-free
power trans-
mission!*



PERKINS MAKES to customers' specifications, in all materials, metallic and non-metallic: bevel gears, ratchets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth. Have us quote on your requirements.

* A new product is the **PERKINS PRECISION SPRING COILER**. This coiler (patent applied for) turns out precision springs—any type, shape, size from wire sizes .005 to .125. Complete data and prices upon request.

* Another new product — the **PERKINS "BENDIT 15"**—a patented

metal forming machine which bends and shapes sheets, rods; strips tubing into innumerable complex as well as simple forms that would be difficult or even impossible to make by other means. Eliminates need for expensive tools or specialized skills. Height 47", net weight 200 lbs. Write us today for descriptive catalog, prices, etc.

PERKINS MACHINE & GEAR CO.
WEST SPRINGFIELD, MASSACHUSETTS

Exhibitors

Continued

Exhibitor	Booth
Linde Air Products Co., New York...	1202
Lynchburg Foundry Co., Lynchburg, Va.	1927
Magna Engineering Corp., Menlo Park, Calif.	751
Magnaflux Corp., Chicago	537
Magnetic Analysis Corp., Long Island City, N. Y.	518
Mahr Mfg. Co., Div., Diamond Iron Works, Inc., Minneapolis	1557
D. E. Makepeace Co., Attleboro, Mass.	560
Malayan Tin Bureau	858
Mall Tool Co., Chicago	1276
P. R. Mallory & Co., Inc., Indianapolis	1950
Manco Mfg. Co., Bradley, Ill.	1480
Marlie Trading, Inc., New York....	1280
Martindale Electric Co., Cleveland..	1762
Master Builders Co., Cleveland....	1777
Mechanical Handling Systems, Inc., Detroit	1472
Metal Products Sales Co., West Hartford, Conn.	817
Metal & Thermit Corp., New York....	430
Metals & Controls Corp., Attleboro, Mass.	1816
Metalweld, Inc., Philadelphia	1272
Metlab Co., Philadelphia	1007
Michiana Products Corp., Michigan City, Ind.	1240
Micrometrical Mfg. Co., Ann Arbor, Mich.	1458
Mid-West Abrasive Co., Owosso, Mich.	1024
Miller Electric Mfg. Co., Appleton, Wis.	631
A. Milne & Co., New York....	506
Milton Equipment Co., Philadelphia..	1562
Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia	211
Morrison Industries, Inc., Cleveland	1804, 1601, 1910
Morton Gregory Corp., Lorain, Ohio	1850
National Bearing Div., American Brake Shoe Div., St. Louis	130
National Carbon Div., Union Carbide & Carbon Corp., New York....	1202
National Cored Forgings Co., Inc., South Norwalk, Conn.	151
National Cylinder Gas Co., Chicago.	1989
National Diamond Laboratory, New York	1477
National Lead Co., New York	411
National Precision Castings Co., Clifton Heights, Pa.	1776

Turn to Page 346

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

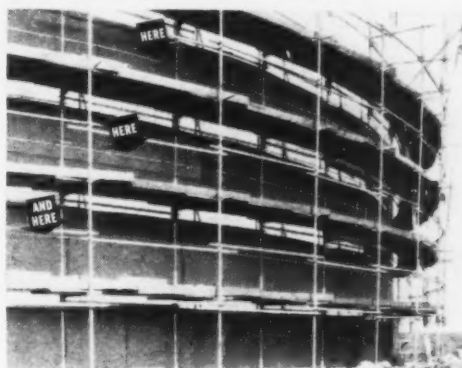
...and saves money in surprising ways!



A SKID-LOAD OF BRICKS is bound quickly and securely with Acme Steel strapping. This makes it easy for the shipper or user to pick up, carry, load, store or tally many bricks at a time, with mechanical power instead of manpower.



THESE BIG TANKS are going all the way from Minnesota to a new works out in Washington. They roll clear across the country but they don't roll off the flatcars because a few loops of Acme Steel strapping hold them safely in place.

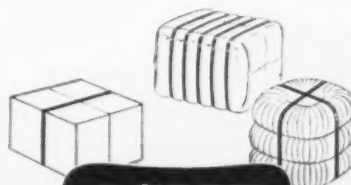


HERE'S A HUGE oil storage tank in process of construction. The arrows point to Acme Steel strapping, securely holding the insulation in place.

You might think that Acme Steel strapping doesn't have much to do with you. At least you seldom see it. But almost everything you use—from food and drink to the very bricks and wood to build your home—comes at least part way to you protected by steel strapping.

Yes, Acme Steel strapping insures Safe Arrival. It not only reduces shipping costs, it also serves (and saves) in many other ways . . . wherever secure fastening and low labor and materials costs are needed.

Write for details to Acme Steel Products Division, Dept. 1A-102.



**ACME
STEEL**

ACME STEEL COMPANY

2825 Archer Avenue, Chicago 8, Illinois



UNIFORM



KESTER FLUX-CORE SOLDER

UNIFORM Reduces Soldering Costs

In using Kester, labor per assembly is held at the lowest practical minimum. Kester's uniformity also reduces waste of critical material to the diminishing point because Kester can give you Solder engineered to your own specific operation.

Kester alone has that necessary flexibility of flux-content (different core-sizes) providing just the right amount of flux needed.

Diameters ranging from 9 thousandths to one-quarter inch available in Kester "44" Resin, "Resin-Five," Plastic Rosin, "A," Nospot, Acid, Knorust and others.

KESTER SOLDER COMPANY
4215 Wrightwood Ave., Chicago 39
Newark 5, New Jersey • Brantford, Canada

**KESTER
SOLDER**

Exhibitors

Continued

Exhibitor	Booth
National Research Corp., Cambridge, Mass.	1211
National Spectrographic Laboratories, Inc., Cleveland	1471
National Torch Tip Co., Pittsburgh ..	1372
National Welding Supply Assn., Philadelphia	1380
Nelco Tool Co., Inc., Manchester, Conn.	1134
Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, Ohio	1850
Newark Wire Cloth Co., Newark, N. J.	1853
New Hermes Engraving Machine Corp., New York	1478
Nicholas Equipment Co., Bellevue, Ohio	911
North American Philips Co., Inc., Mt. Vernon, N. Y.	1861
Oakite Products, Inc., New York	1715
Ohio Crankshaft Co., Cleveland	1377
Ohio Seamless Tube Co., Shelby, Ohio	1820
Ohio Steel Foundry Co., Lima, Ohio ..	1958
Tinius Olsen Testing Machine Co., Willow Grove, Pa.	1419
O'Neil-Irwin Mfg. Co., Lake City, Minn.	630
Opplem Co., Inc., New York	115
Osborn Mfg. Co., Cleveland	729
Pangborn Corp., Hagerstown, Md.	901
Park Chemical Co., Industrial Div., Detroit	312
Parker Machine Co., Inc., Brooklyn ..	1732
Parker Rust Proof Co., Detroit	1909
Partlow Corp., New Hartford, N. Y.	1577
Peters-Dalton, Inc., Detroit	1410
Philadelphia Bronze & Brass Co., Philadelphia	1587
Philadelphia Electric Co., Philadelphia	1483
Phillips Mfg. Co., Inc., Chicago	635
Physicists Research Co., Ann Arbor, Mich.	1458
Picker X-Ray Corp., White Plains, N. Y.	441
Pittsburgh Tube Co., Pittsburgh	240
Polyplastex International, Inc., New York	927
Porter-McLeod Machine Tool Co., Inc., Hatfield, Mass.	1271
Porter Precision Products Co., Cincinnati	1025
Precision Metalsmiths, Inc., Cleveland	1461
Precision Products Co., Branford, Conn.	1125
Precision Shaves, Inc., Suffern, N. Y.	1015

Turn to Page 348

MELTRITE

PIG IRON

Demand Reflects Value



Making MELTRITE
Pouring molten iron into
moulds at the pig machines.

MORE USED THAN ANY OTHER MERCHANT PIG IRON

69 years of
service
to industry

PICKANDS MATHER & COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

CHICAGO • CINCINNATI • DETROIT • DULUTH • ERIE • GRAND RAPIDS
GREENSBORO • INDIANAPOLIS • MINNEAPOLIS • ST. LOUIS • WASHINGTON

IRON ORE • PIG IRON • COAL • COKE



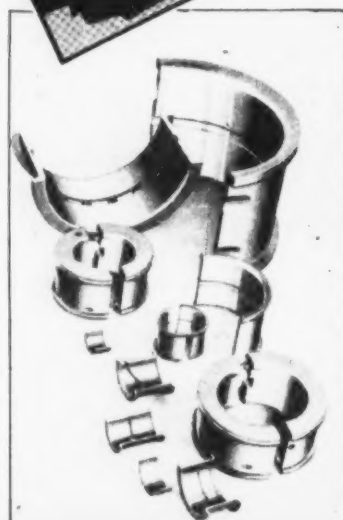
JOHNSON SLEEVE BEARINGS Babbitt Lined

*avored
for
many
applications*

BECAUSE of the many inherent properties of babbitt as a bearing material, it fits into numerous applications. Babbitt provides a natural low coefficient of friction, easy conformability, high imbeddability, good wettability with lubricants, and high corrosion resistance to most oils. Coupled with these features, bronze or steel backing gives the necessary strength to the bearing. The alloy of lead base or tin base babbitt and the backing metal can be selected to meet operating conditions.

Through long years of research and experience, Johnson Bronze Company has developed a method of combining babbitt and either bronze or steel into a durable, lasting bond. This, together with the knowledge of the relative thicknesses of babbitt and backing for utmost efficiency and high quality workmanship, assure you of long, satisfactory service from Johnson Babbitt-Lined Bearings. Our engineers will gladly consult with you on proposed applications.

JOHNSON BRONZE COMPANY
505 South Mill St., New Castle, Pa.



Technical data sheets
on babbitt-lined bearings
will be sent free
on request.

Write for an appointment



SHEET BRONZE
Plain or graphited

LEDALOYL
Self-Lubricating

ALUMINUM
ALLOY

BRONZE-
ON-STEEL
Copper Alloy

CAST BRONZE
Plain or graphited

JOHNSON **B** BEARINGS
Sleeve B Type

Exhibitors

Continued

Exhibitor	Booth
Precision Welder & Flexapress Corp., Cincinnati	842
Production Machine Co., Greenfield, Mass.	1540
Progressive Welder Sales Co., Detroit 928, 1105	
Pyrometer Instrument Co., Inc., Bergenfield, N. J.	1729
Ransburg Electro-Coating Corp., Indianapolis	1983
Raytheon Mfg. Co., Waltham, Mass.	1815
Reeves Pulley Co., Columbus, Ind.	1553
J. W. Rex Co., Lansdale, Pa.	1750
Reynolds Metals Co., Louisville, Ky.	1550
J. A. Richards Co., Kalamazoo, Mich.	1277
Riehle Testing Machines Div., American Machine & Metals, Inc., East Moline, Ill.	1239
Rochester Products Div., General Motors, Corp., Rochester, N. Y.	1031
Rockwell Mfg. Co., Pittsburgh.	1650
Rodgers Hydraulic, Inc., Minneapolis	1558
Rolle Mfg. Co., Inc., Lansdale, Pa.	750
Rolack, Inc., Fairfield, Conn.	1810
Joseph T. Ryerson & Son, Inc., Chicago	318
"S" Corrugated Quenched Gap Co., Garfield, N. J.	1119
S & S Machinery Co., Brooklyn.	1657
Sales Service Machine Tool Co., St. Paul	1467
Sandvik Steel, Inc., New York.	402
George Scherr Co., Inc., New York.	1269
Schnell Tool & Die Corp., Salem, Ohio	1453
A. Schrader's Son Div., Scovill Mfg. Co., Inc., Brooklyn	1856
Sciaky Bros., Inc., Chicago.	1719

Turn to Page 350



"That's his fifth trip today."

Booth

842
1540
1105
1729
1983
1815
1553
1750
1550
1277
1239
1031
1650
1558
750
1810
318
1119
1657
1467
402
1269
1453
1856
1719

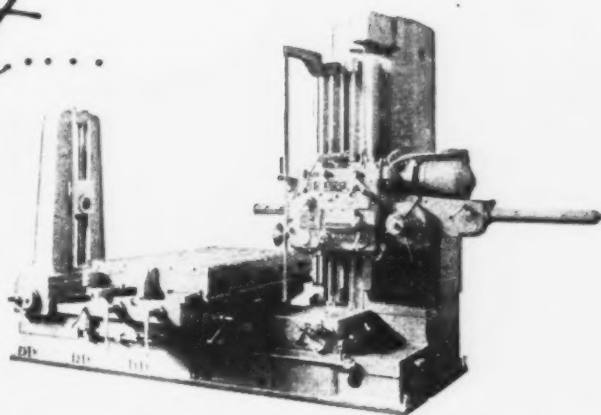


AGE

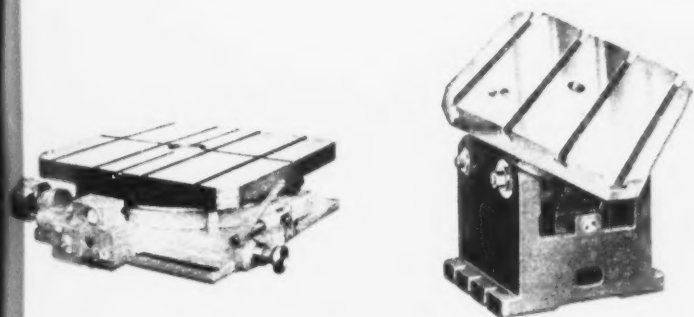
however you figure it....

Gilberts pay off!

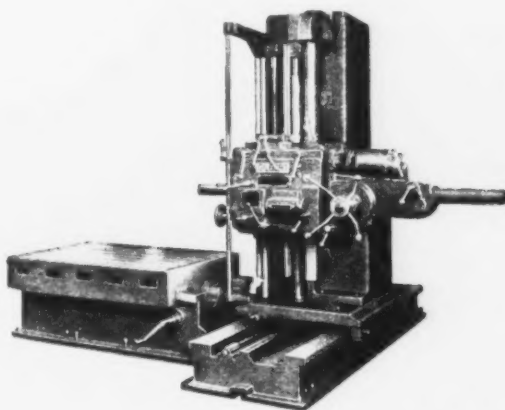
Whatever your yardsticks—sustained accuracy, operator convenience, long life, work per hour, or earning power per square foot of floor space—you'll find Cincinnati Gilbert's advanced construction features provide long range paying investments. On your next purchase of radials or horizontal boring mills check with your nearby Cincinnati Gilbert representative.



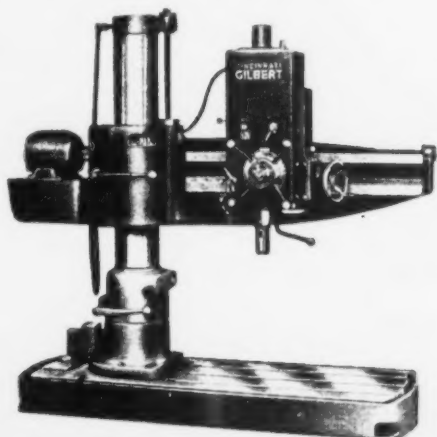
Horizontal Boring Mill: Compound rectangular table type. Head travel: 36" to 72". Bed: 84" to 120". Spindle diameter: 3 1/2" or 3 3/4". Write for Bulletin 1040-R. Compound built-in rotary table types also furnished in comparable sizes: Bulletin 348.



Rotary Table: (left) Worm driven with power rapid revolving. Hand adjustment made with dial on worm shaft reading in minutes. Dial type indexing, 36" and 50" square or round. **Universal Table:** (right) Five sides of a cube can be machined at one setting of work piece. Sizes: 22" x 22" and 27" x 27" top.



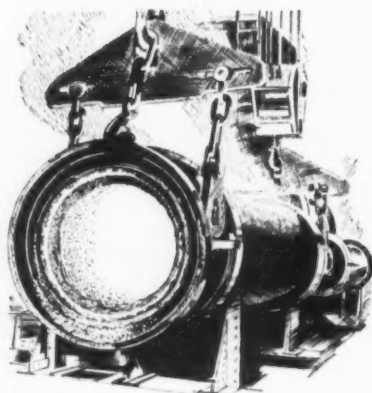
Horizontal Boring Mill: Floor type. Head travel: 36" to 96". Column traverse: 36" to 168". Spindle diameters: 3 1/2" or 3 3/4". Can be equipped with floor plates; boring bar supports; stationary, sliding, or built-in rotary tables; revolving columns, and special arrangements. Write for Bulletin 1244.



Radial Drilling Machine: 9" and 11" columns. Centralized, "comfort level" controls. 12 speeds, 6 feeds. Twelve basic features make these the most modern radials you can buy. Write for Bulletin 349.

THE CINCINNATI
GILBERT
MACHINE TOOL COMPANY
3366 BEEKMAN STREET • CINCINNATI 23, OHIO

Here's Another "Pipe Dream" That Came True in the BIRMINGHAM DISTRICT

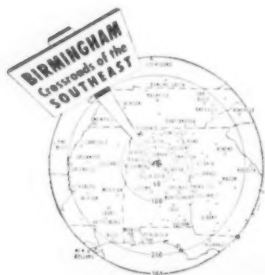


In this central district of the Southeast, six huge pipe plants produce 60% of the Nation's cast iron pressure pipe. Typical of the district's great pipe plants that have advanced from small beginnings to the front rank of American industry is the—



AMERICAN CAST IRON PIPE COMPANY

Availability of pig iron primed the Company's establishment in 1905. Widespread building of waterworks and sewage disposal plants throughout the U. S. A. broadened its markets. Birmingham's strategic location as a distribution center and cooperative and efficient labor played a major role in its growth. These have been reinforced by a progressive management which pioneered the centrifugal "Mono-Cast" pipe spinning process and added recently extensive new facilities for making cast steel parts, tubes and industrial alloys. These find a market throughout this country and abroad. Many of "Acipco's" steel and alloy iron castings are finished for end use at its own plant. Because of limited open facilities in the Birmingham district for finished machining, a substantial tonnage of castings is shipped to machine shops in other States for final processing. Officers of "Acipco" and other Birmingham enterprises look forward to the day when many more well-equipped machine shops will locate in this area to fill a need and find opportunity for service and reward.



★ ★ ★ ★ ★
Members of the Birmingham Committee of 100 invite you to write for factual, specific information on what the Birmingham district has to offer you as a location for your branch plant, warehouse or sales office.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

Executive Committee

Gordon Persons
Governor
State of Alabama
Bradford C. Colcord
President
Woodward Iron Co.
John S. Coleman
President
Birmingham Trust
National Bank
Donald Comer
Chairman of the
Executive Committee
Avondale Mills

William P. Engel
President
Engel Companies
W. W. French, Jr.
President
Moore-Handley
Hardware Co.
Clarence B. Hanson, Jr.
Publisher
The Birmingham News
W. H. Hoover
President
Employers Insurance
Co. of Alabama

Claude S. Lawson
President
United States
Pipe & Foundry Co.
Thomas W. Martin
Chairman of the Board
Alabama Power Co.
Fred Osborne
President
Sloss-Sheffield
Steel & Iron Co.

J. C. Persons
President
First National Bank
O. W. Schanbacher
President
Laveman, Joseph &
Loeb
Mervyn H. Sterne
Sterne, Agee & Leach
A. V. Wiebel
President
Tennessee Coal & Iron Div.
United States Steel Co.

Exhibitors

Continued

Exhibitor	Booth
Scientific Electric Div., "S" Corrugated Quenched Cap Co., Garfield, N. J.	1227
C. U. Scott & Son, Inc., Rock Island, Ill.	1228
Scovill Mfg. Co., Waterbury, Conn.	1685
Selas Corp. of America, Philadelphia	1601, 1910
Sentry Co., Foxboro, Mass.	1324
Sharon Steel Corp., Sharon, Pa.	660
Sheldon Machine Co., Inc., Chicago	841
Shell Oil Co., New York	1349
A. O. Smith Corp., Milwaukee	354
Smith Welding Equipment Corp., Min- neapolis	1828
Snap-On Tools Corp., Kenosha, Wis.	1127
Socony-Vacuum Oil Co., New York	1876
Solventol Chemical Products, Inc., De- troit	512
South Chester Corp., Lester, Pa.	1026
Sparkler Mfg. Co., Mundelein, Ill.	1875
Special Libraries Assn., New York	1020
Spencer Turbine Co., Hartford	1601, 1910
Sperry Products, Inc., Danbury, Conn.	1754
Standard Alloy Co., Cleveland	1250
Standard Die Set Manufacturers, Inc., Providence	1640
Standard Electrical Tool Co., Cincin- nati	908
L. S. Starrett Co., Athol, Mass.	1843
Steel City Testing Machines, Inc., De- troit	1416
Steel Founder's Society of America, Cleveland	101
Steel-Parts Mfg. Co., Div. of Black- stone Mfg. Co., Inc., Chicago	1382
Steels Engineering Products, Canada, Ltd., Toronto	1369
Sterling Electric Motors, Inc., Los Angeles	1949
Frederic B. Stevens, Inc., Plating Equipment & Supply Div., Detroit	244
Edwin B. Stimpson Co., Inc., Brooklyn	605
F. J. Stokes Machine Co., Philadelphia	1385
Stone Machinery Co., Inc., Manlius, N. Y.	551
D. A. Stuart Oil Co., Chicago	1251
Sub Zero Products Mfg. Div., Deep- freeze Distributing Corp., Cincin- nati	1320
Sun Oil Co., Philadelphia	1417
Superdraulic Corp., Detroit	1817
Super-Grip Anchor Bolt Co., Inc., Philadelphia	1411
Superior Tube Co., Norristown, Pa.	1610
Surface Combustion Corp., Toledo	211

Turn to Page 352

VISIT US IN BOOTH 104,
NATIONAL METAL EXPOSITION,
PHILADELPHIA, OCTOBER 20 TO 24



tool steel is our fair-haired boy!

We are definitely partial toward *our* tool steel. Especially since users have verified our opinion of them by making us the country's number one producer of fine tool steel.

Naturally, we intend to maintain this position. Therefore, Crucible research and development is forging ahead, supplying industry's need for new, improved tool steels . . . Crucible makes its long experience freely available to you through its metallurgical service . . . And Crucible provides you with prompt delivery of tool steel, from its completely stocked warehouses, conveniently near you.

SEND TODAY for the unique Crucible Tool Steel Selector—a twist of the dial gives the tool steel for your application.

Rex® High Speed Steels
Peerless Hot Work Steels
Halcomb 218
Chro-Mow®
Sanderson Carbon Tool Steels
Ketos®
AirKool Die Steel
Airdi® 150
Nu-Die V Die Casting Steel
CSM 2 Mold Steel
La Belle® Silicon #2
Atha Pneum

SPECIFY
YOUR TOOL STEELS
BY
THESE
BRAND NAMES

Crucible Steel Company of America

Dept. 1, Chrysler Building, New York 17, N. Y.

Name _____

Company _____ Title _____

Address _____ City _____ State _____



9" diameter,
3-colors

CRUCIBLE

first name in special purpose steels

TOOL STEELS

52 years of *Fine* steelmaking

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

October 9, 1952

351

YOUR PRODUCTION AND PROFITS ARE BEING LOST HERE!

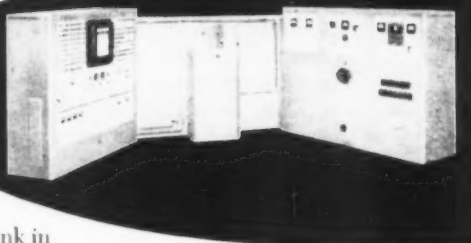


Are You Wasting Critical and Expensive Materials In Your Slag Heap?

Steel producers know that up to 20% of the alloying elements used in special steels, which have to be present, often are lost in the slag. Constant and tedious laboratory analysis of both the steel and the slag is necessary to maintain proper production control. In addition to loss of money in replacing these elements, much time can be wasted in actual production.

HERE'S WHAT YOU CAN DO ABOUT IT...

The ARL Production Control Quantometer—long used for chemical analysis of steel and other alloys—has now been adapted for the analysis of slags! Accurate percentages of elements present in *both* steel and slags are recorded permanently in pen-and-ink in



less than two minutes...a great saving in production time and money. This makes it possible to prevent material loss *before* it occurs. Individual Quantometers are not limited to a single type of analysis, but can be designed to meet the requirements of many plant problems. As many as 25 elements as selected by the user can be accurately measured on the instrument—up to 20 simultaneously. The ARL Quantometer is the most advanced type of spectrometer yet developed, and its use can mean a great saving to you in production control costs and vital materials conservation. Write for complete information.

THE ARL LINE ALSO INCLUDES 1.5 AND 2-METER SPECTROGRAPHS, PRECISION SOURCE UNITS, RAMAN SPECTROGRAPHS AND RELATED ACCESSORIES.

See You at the Metals Show! Booth No. 1757



Applied Research Laboratories
SPECTROCHEMICAL EQUIPMENT

3717 PARK PLACE GLENDALE 8, CALIFORNIA
NEW YORK • PITTSBURGH • DETROIT • CHICAGO • DALLAS • LOS ANGELES

Exhibitors

Continued

Exhibitor	Booth
Sutton Engineering Co., Bellefonte, Pa.	740
Swan-Finch Oil Corp., New York	1032
Taco Heaters, Inc., Providence	1829
Tempil Corp., New York	155
Texas Co., New York	717
Thread-All Sales Co., Detroit	918
Tide Water Associated Oil Co., New York	1450
Tin Research Institute, Inc., Columbus, Ohio	852
Tincher Products Co., Sycamore, Ill.	1975
Tinnerman Products, Inc., Cleveland	1330
Titanium Alloy Mfg. Div., National Lead Co., New York	1316
Titanium Metals Corp. of America, New York	120
Tocco Div., Ohio Crankshaft Co., Cleveland	1377
Topper Equipment Co., Matawan, N. J.	1351
Torit Mfg. Co., St. Paul	1881



"That's a heck of a way to go after business, I'd say!"

Turco Products, Inc., Los Angeles	1028
Tyler Mfg. Co.	1280
Uddeholm Co., New York	915
Udylite Corp., Detroit	218
Union Carbide & Carbon Corp., New York	1202
Union Steel Products Co., Materials Handling Div., Albion, Mich.	1216

Turn to Page 354



IF IT IS
DESIGNED
TO BE
MOVED...



specify



MAGNESIUM

Ease-of-handling is one of the functions of almost every product that is made to be moved. Working towards this end, designers require a material that is light weight yet strong and readily worked.

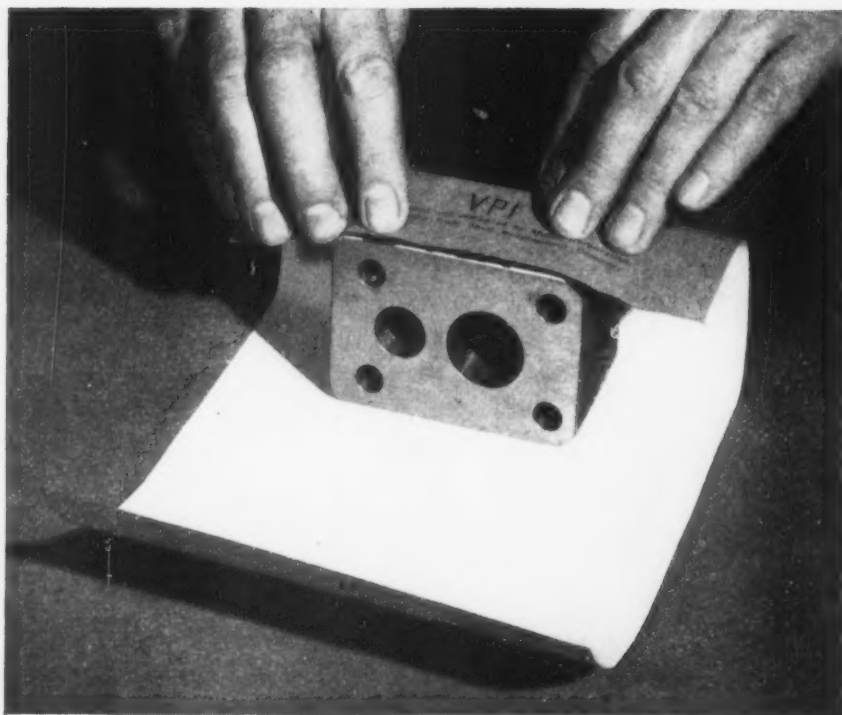
Whether it is a dockboard that is subjected to great and varied stresses, or a dictating machine that must be easily portable and well protected—magnesium fulfills every requirement. Magnesium is the lightest of all structural metals and has a high strength-to-weight ratio.

For the manufacturer these advantages mean *higher sales* through maximum product utility... *increased profits* through lower production costs resulting from simplified construction. For the designer magnesium offers flexibility of design with a variety of alloys possessing characteristics of strength, toughness, machinability and corrosion resistance. Magnesium is produced in all common forms including castings, forgings, extrusions, sheet and plate—and can be economically worked by all standard shop practices.

If you design with motion in mind you'll consider the lightest of all metals... **MAGNESIUM.**

THE DOW CHEMICAL COMPANY
Magnesium Department • Midland, Michigan

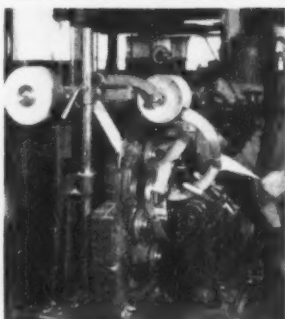




VPI shroud
— no oil or
goo used.



Angier VPI
peripheral
wrap



VPI Wrap
used as
an insert.



Vapor from paper STOPS RUST

Simple as it seems, this Angier paper is merely placed near metal to *prevent rust*. It gives off a vapor that makes air and moisture harmless to steel.

Angier VPI® Wrap makes coating with oil or goo a needless chore. All "cleaning" costs are saved. Metal stored or shipped with VPI always is ready for instant use . . . what *sales appeal* for your products! Rejects due to rust are eliminated.

If *your* products must be guarded from rust (for days or *years*) send the coupon now for facts.



DISTRIBUTORS IN PRINCIPAL CITIES

The Most Experienced Name
in Vapor Rust Preventives

Angier Corp., Framingham 10, Mass.

Name

Title

(Clip this to your letterhead)

Please send "VPI Facts" as applied to:

- | | |
|---|--|
| <input type="checkbox"/> Machinery-Industrial, Metal Working, Farm, Office, Construction. | <input type="checkbox"/> Electrical Machinery, Appliances, Products. |
| <input type="checkbox"/> Transportation Equipment — Auto, Aircraft, Naval, Railroad, etc. | <input type="checkbox"/> Fabricated Products — Cutlery, Hardware, etc. |
| <input type="checkbox"/> Steel in process of fabrication. | <input type="checkbox"/> Ordnance Equipment. |
| <input type="checkbox"/> Instruments and clocks. | <input type="checkbox"/> Other. |

Exhibitors

Continued

Exhibitor	Booth
U. S. Electrical Motors, Inc., Los Angeles	760
U. S. Pipe & Foundry Co., Special Products Div., Burlington, N. J.	702
U. S. Plywood Corp., New York	1282
Upton Electric Furnace Co., Detroit	1519
Vanadium Corp. of America, New York	618
Vapofier Corp., Chicago	1953
Versa-Mil Co., New York	741
Viking Sales, Inc.	928
Waldes Kohinoor, Inc., Long Island City, N. Y.	1915
Walker-Turner Div., Kearney & Trecker Corp., Plainfield, N. J.	1941
Wall Colmonoy Corp., Detroit	1131
Warner Div., Clinton Machine Co., Detroit	610
Waukee Engineering Co., Milwaukee	1223
Webber Appliance Co., Inc., Indianapolis	1368
Welders Supply & Mfg. Co., Cincinnati	1380
Weldwire Co., Inc., Philadelphia	1383
Wells Mfg. Co., Three Rivers, Mich.	1678
Westinghouse Electric Corp., Pittsburgh	1510
Weston Electrical Instrument Corp., Newark, N. J.	1011
Wheelco Instruments Co., Chicago	641
Whitehead Metal Products Co., Inc. New York	1283
Edwin L. Wiegand Co., Pittsburgh	1244
Williams, Brown & Earle, Inc., Philadelphia	1232
Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc., Bridgeport, Conn.	706
Worthington Corp., Harrison, N. J.	1720
Carl Ziess, Inc. New York	920



"Amazing! Starts with mashed potatoes."

th
60
02
02
9
18
53
41
28
15
41
31
10
23
68
80
83
78
10
11
41
83
44
32
06
20
20

3

A
B E

os."

GE

AN

AFR
BELG
F



FORGING MACHINERY

KNOWN THROUGHOUT THE WORLD

AGENTS IN

AFRICA • ARGENTINE • AUSTRALIA • AUSTRIA •
BELGIUM • BRITISH ISLES • CENTRAL and SOUTH AMERICA
FRANCE • HOLLAND • INDIA • ITALY • JAPAN
PAKISTAN • SWEDEN • SWITZERLAND

THE

Ajax

MANUFACTURING
COMPANY

EUCLID BRANCH P. O. CLEVELAND 17, OHIO

110 S. DEARBORN ST.
CHICAGO 3, ILLINOIS

DEWART BUILDING
NEW LONDON, CONN.

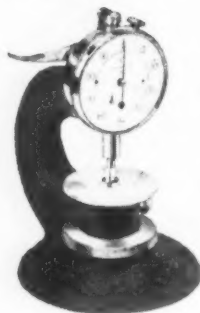
FOR *Strictly* IMPERSONAL INSPECTION CHOOSE **AMES** DIAL COMPARATORS

Ames Dial Comparators make the inspection of duplicate parts an extremely simple, rapid and accurate operation. Ames Comparators are strictly impersonal in their accuracy — the results being in no way dependent on the skill or judgment of the operator. The pressure of the gauging members against the work is mechanically determined and therefore uniform.

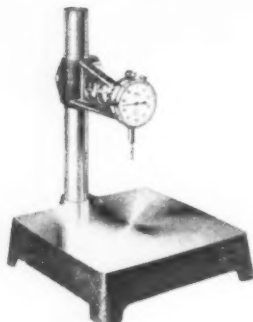
Check the Ames Dial Comparators shown — one of them may solve a Quality Control problem for you.



Ames No. 1 Dial Comparator is an easily adjustable bench model that measures objects up to 2" in cross section. The table bracket may be quickly located and locked in position on the column. The table itself may be further positioned and locked for final fine adjustment. This comparator is designated *Ames No. 1W* when equipped with dead-weight contact pressure and contact area to ASTM specifications for measuring resilient materials, such as rubber, plastics, etc.



Ames No. 2 Dial Comparator is a compact, stable bench model for measuring non-yielding materials — sheet metal, glass, hard rubber. The 2" diameter table is adjustable to bring pointer to zero. *Ames No. 2W* is similar to the Ames No. 2, but is furnished with dead-weight contact pressure and contact areas to ASTM specifications for checking textiles, plastics, sheet rubber, etc.



Ames No. 13 Dial Comparator features flat-ground, cast-iron base of ample size for using V-blocks and locating fixtures for checking rounds, flats and odd shapes. Also, the No. 13 can be fitted with a fine adjustment for close setting. Accurately adjustable bracket holds any Ames Micrometer Dial Indicator.



Ames No. 130 Dial Comparator is designed especially for inspecting comparatively large parts. For this reason, the flat-ground steel base, the adjustable indicator support on which can be mounted any Ames Micrometer Dial Indicator, and the upright column are proportioned to suit the user's particular requirements.

Send us your Quality Control job specifications, and we will supply complete details and proposal without obligation.

Representatives in
principal cities.

B. C. AMES CO. 25 Ames Street
Waltham 54, Mass.

Mfr. of Micrometer Dial Gauges • Micrometer Dial Indicators

—Technical Program—

Continued from Page 258

Effect of Carbon Content on 18-4-1 High Speed Steel—A. H. Grobe, research metallurgist, and G. A. Roberts, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.

Correlation of Machinability with Inclusion Characteristics in Resulfurized Bessemer Steels—L. H. VanVlack, process metallurgist, United States Steel Co., Pittsburgh.

Wednesday, Oct. 22, 9:30 a.m.

ASM ANNUAL MEETING

Edward DeMille Campbell Memorial Lecture

By Dr. Cyril Stanley Smith, Director
Institute for the Study of Metals,
Chicago, Ill.

Wednesday, Oct. 22, 2:00 p.m.

A Study of the Mechanism of the Delayed Yield Phenomenon—T. Vreeland, Jr., D. S. Wood and D. S. Clark, Department of Mechanical Engineering, California Institute of Technology, Pasadena, Calif.

Determination of Oxygen in Metals and Metal Oxides by the Isotopic Method—A. D. Kirshenbaum and A. V. Grosse, Research Institute of Temple University, Philadelphia.

The Indium-Arsenic System—T. S. Liu, Horizons, Inc., Cleveland, and E. A. Peretti, acting head, Department of Metallurgy, University of Notre Dame, Notre Dame, Ind.

Thursday, Oct. 23, 9:30 a.m.

MECHANICAL PROPERTIES

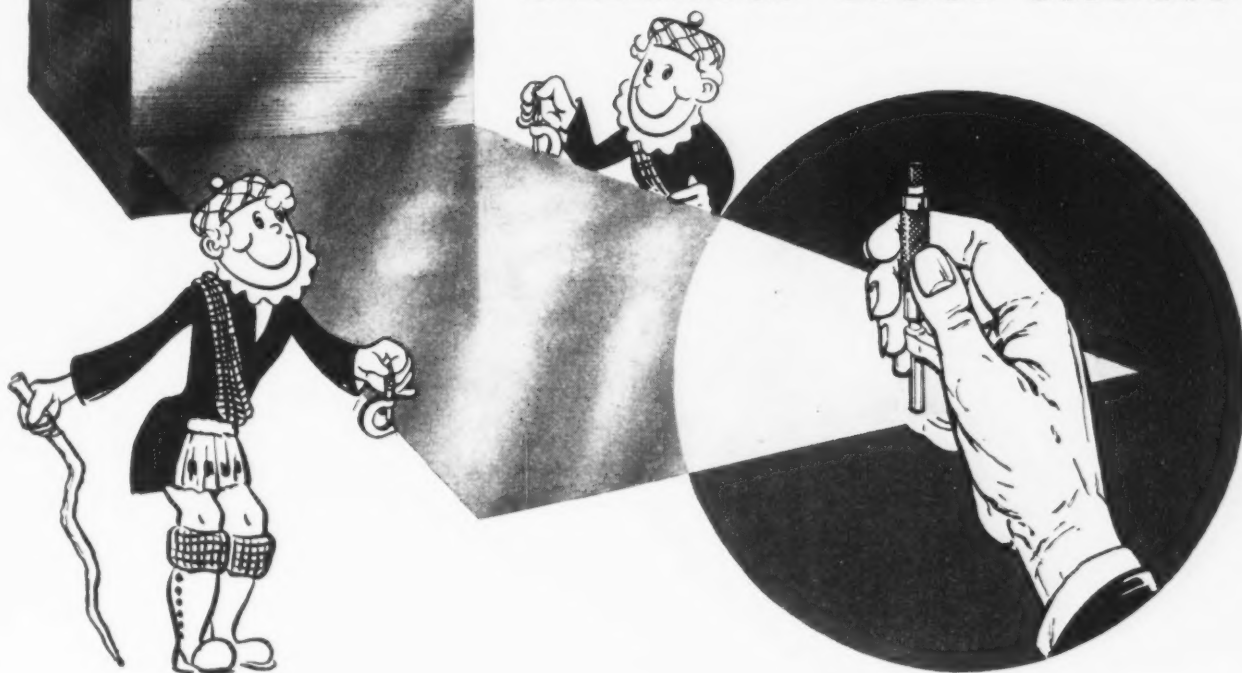
The Effect of Quenching and Tempering on Residual Stresses in Manganese Oil-Hardening Tool Steel—H. J. Snyder, research associate, Mellon Institute of Industrial Research, Pittsburgh.

X-Ray Measurement of Residual Stress in Hardened High Carbon Steel—A. L. Christenson, research metallurgist and E. S. Rowland, chief metallurgical engineer, Tinklen Roller Bearing Co., Canton, Ohio.

Turn Page

In these days of
HIGH DIE COSTS

MicroRold[®]
Stainless Steel Sheets



WILL SAVE YOU MONEY!

The unusual uniformity of gauge in MicroRold allows for closer die setting, assuring the fabricator of uninterrupted production in stamping, forming and blanking operations.

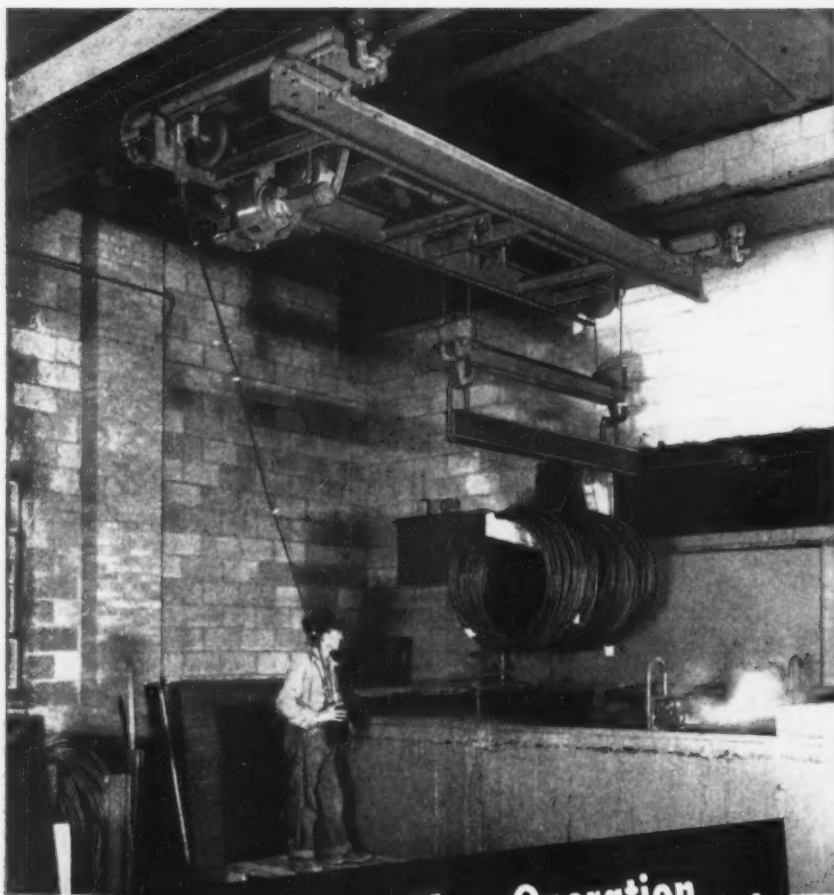
This closer control of MicroRold sheet thickness *increases the productive life of the die and reduces to an amazing degree*

the number of rejects. One fabricator reports less than $\frac{1}{2}$ of 1% breakage in a 12½" draw on a 17" blank with a rectangular cross-section.

From edge to edge—and end to end—only MicroRold has such outstanding uniformity of gauge.

WASHINGTON STEEL CORPORATION
WASHINGTON, PENNSYLVANIA





Continuous One Man Operation . .

with **AMERICAN MONORAIL**

Here's an operation that must be on the go, all the time and fast, and yet, one man plus an American MonoRail Crane keeps the line flowing smoothly and fast. Fast operating, constant service, American MonoRail Cranes are ruggedly built to handle loads up to 10 tons at operating speeds of 500 feet per minute. Articulated trolleys assure perfect alignment of trucks for smooth crane travel.

Let an American MonoRail engineer explain all the advantages of these constant service cranes.

THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE

CLEVELAND 7, OHIO

—Technical Program—

Continued

The Endurance Limit of Temper Brittle Steel—R. D. Chapman, research metallurgist, and W. E. Jominy, chief metallurgist, Research, Chrysler Corp., Detroit.

Plastic Stress-Strain Relations of Alcoa 14S-T6 for Variable Biaxial Stress Ratios—Joseph Marin, professor of engineering mechanics, L. W. Hu and J. F. Hamburg, Dept. of Engineering Mechanics, Pennsylvania State College, State College, Pa.

Thursday, Oct. 23, 2:00 p.m.

TEMPER BRITTLENESS

The Effect of Various Heat Treating Cycles Upon Temper Brittleness—J. D. Jaffe and D. C. Buffum, Watertown Arsenal Laboratory, Watertown, Mass., and F. L. Carr, National Research Corp., Cambridge, Mass.

Effect of Hardness on the Level of the Impact Energy Curve for Temper Brittle and Unembrittled Steel—F. L. Carr, National Research Corp., Cambridge, Mass., M. Goldman, Battelle Memorial Institute, Columbus, L. D. Jaffe and D. C. Buffum, Watertown Arsenal Laboratory, Watertown, Mass.

Transverse Mechanical Properties in an SAE 1045 Forging Steel—A. H. Grobe, research metallurgist, Vanadium Alloys Steel Co., Latrobe,

Turn to Page 362



"One metallurgist!"

Time to get out the

brass knuckles

Sporadic quality in your manufactured metal products—today more than ever—can cast your business quickly into chaos. It's a brass-knuckle blow at this uncertain, unsteady quality when you can specify Titan brass as your original material.

Free-cutting brass rod, for instance, is the most easily-machined of all metals (alloyed and unalloyed). Clean, bright brass has the endurance of a Titan. Titan brass and bronze rods, shapes, welding rod and wire, forgings and die castings undergo exacting quality control by the most modern means. In fact, Titan pioneered in the brass industry the Quantometer, a direct-reading spectrometer for precise raw-material choosing and rigid production control.

Learn more about Titan brass and bronze products, and Titan's famous quality. Write for details.



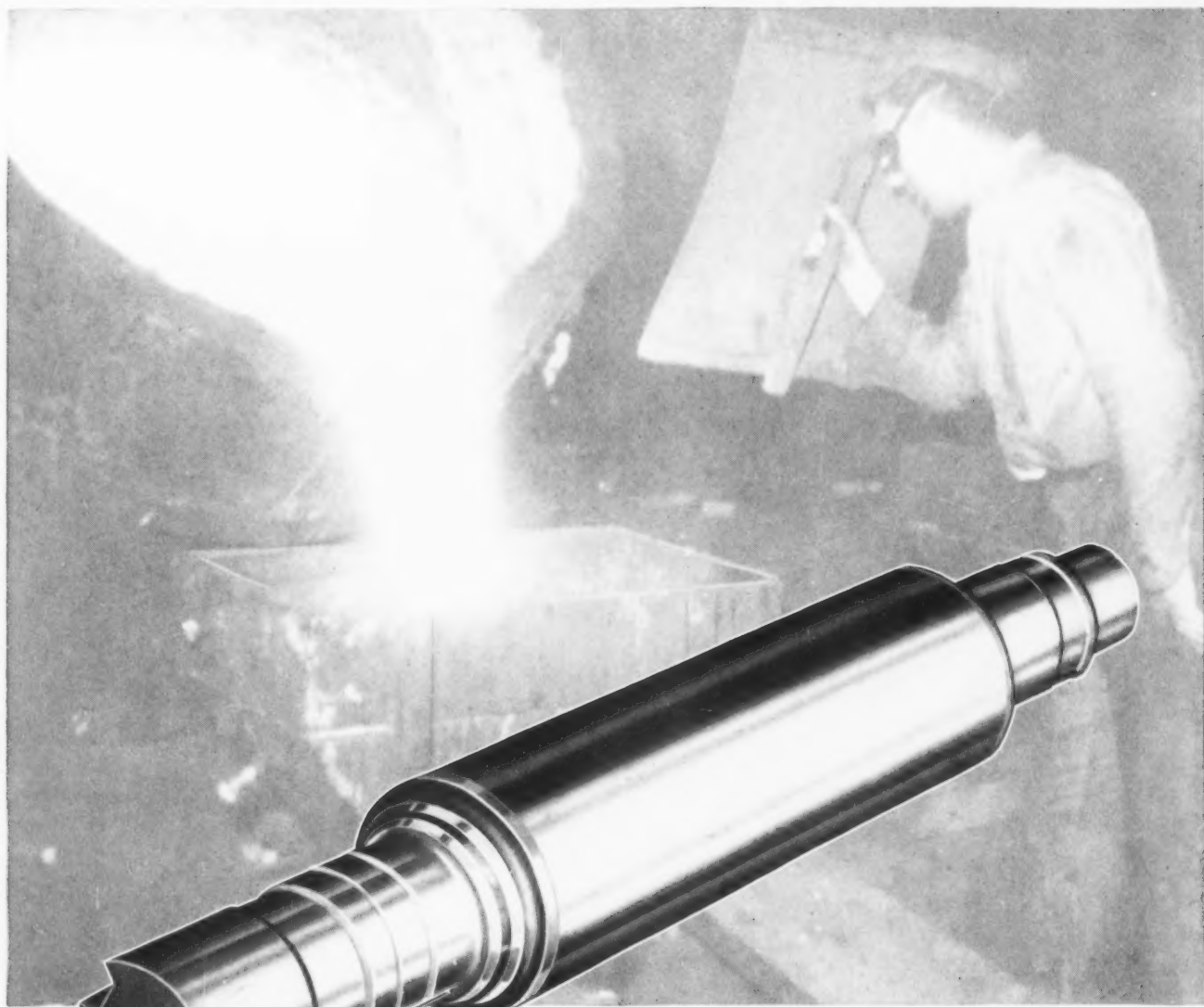
Titan

METAL MANUFACTURING COMPANY

Bellefonte, Pa. Offices and Agencies in Principal Cities

Quality Alloys by Brass Specialists

RODS . FORGINGS . DIE CASTINGS . WELDING RODS . WIRE

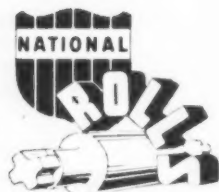


RIGHT... *from the start*

Successful pouring of a roll is the most important factor in its successful performance . . . that's why National's metallurgical knowledge and practical experience are so important, too, right from the start.

At National, correct metallurgical composition, uniform casting and precision turning combine to provide maximum strength and satisfactory performance.

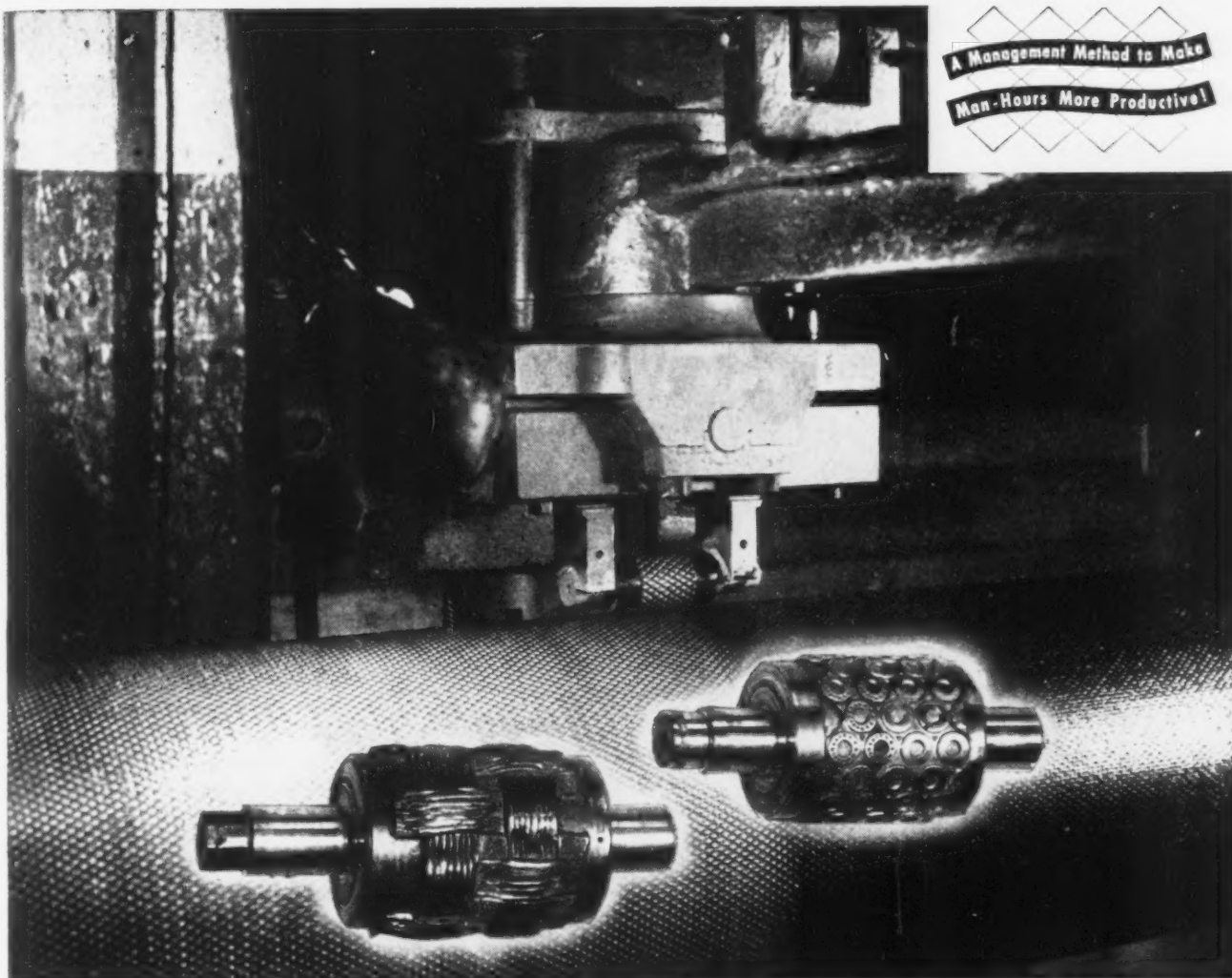
Whether your requirements call for iron or alloy iron rolls in rough, necked, rough turned or finished form, National is staffed and equipped to produce them.



THE NATIONAL ROLL & FOUNDRY CO.

Avonmore, Pennsylvania

SPECIALISTS IN
IRON AND ALLOY IRON ROLLS AND CASTINGS



How to Put Delicate Patterns Through a 5-Ton "Wringer", Successfully



These knurling mills, made from No. 11 Special (Water-Hard) Tool Steel, press artistic patterns into large steel rolls for embossing cloth, paper and plastic. Here's what was required of the tool steel: It had to be hard enough to prevent upsetting; tough enough to prevent delicate edges from breaking under operating pressures up to 5 tons. Patterns on the mills were quite fragile and sections as deep as $\frac{1}{16}$ " could not collapse. Further, the steel had to heat treat with very little warpage.

But picking the proper steel wasn't as

tough as you may imagine. For the Carpenter Matched Set Method not only indicated the one *best* steel for the job but enabled production management to "call its shots" . . . have the mills produce the required number of patterns on schedule, with less costly downtime.

For any plant making or using tools and dies, the Matched Set Method offers even

more advantages than simplified selection. You benefit from lower tool steel inventories, heat treating economies, simplified toolroom and production procedures. To discover how it can work for you in your plant, write for the new booklet "How to Get Better Tool and Die Performance". THE CARPENTER STEEL CO., 121 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co.
Port Washington, N.Y.—"CARSTEELCO"

Carpenter



MATCHED TOOL & DIE STEELS

More than top-grade steels . . . a **Method** to keep tooling and production on schedule!

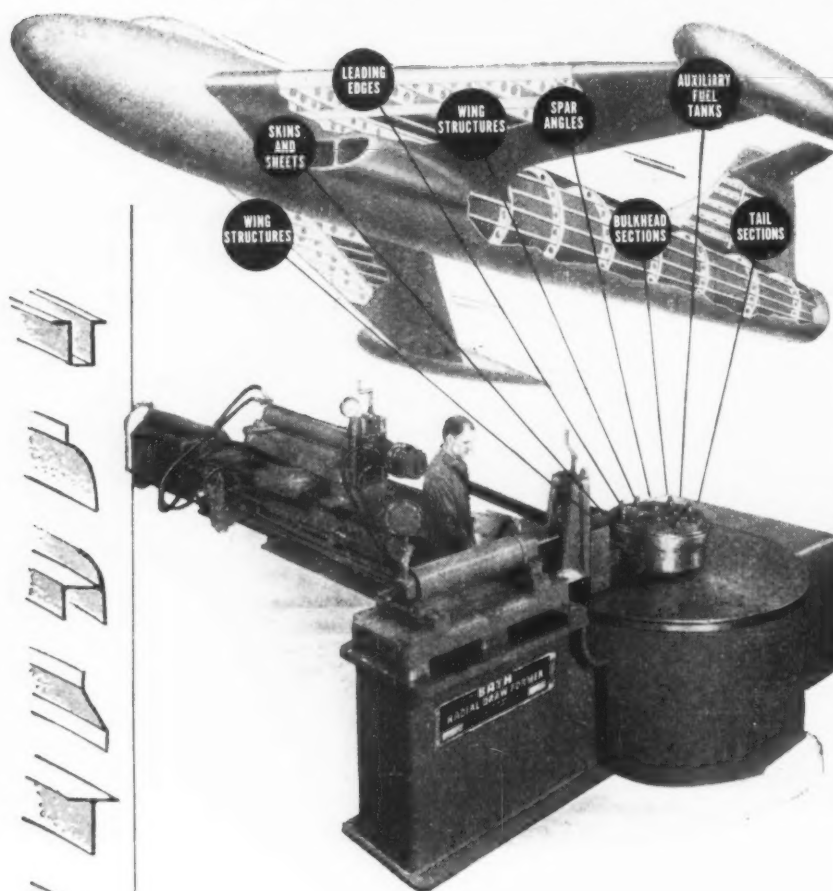
For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country

October 9, 1952

361

LEADING AIRCRAFT MANUFACTURERS ARE BUYING

BATH RADIAL DRAW CONTOUR FORMERS



AIRCRAFT FUSELAGE AND JET ENGINE COMPONENTS IN PRODUCTION QUANTITIES ... FAST AND ACCURATE!

The versatility of the Bath Radial Draw Contour Former makes it a natural for forming aircraft fuselage, jet engine and guided missile parts. Stretch and compression formed, the parts pass rigid inspection. Cross sections of roll-formed and extruded parts as shown at left, are faithfully maintained throughout varied bends.

The performance range extends from shallow bends in formed strip stock and sharp bends in flanged extrusions to full circles and spirals in metals from 245T aluminum to titanium of 95% purity.

Machine capacities from 12½ to 200 tons in standard Models. Write for catalog CF-352.

THE CYRIL **BATH** COMPANY

Manufacturers of Metal Forming Machinery

6940 MACHINERY AVENUE • CLEVELAND 3, OHIO

Technical Program

Continued

Pa., Cyril Wells, member of staff, and R. F. Mehl, director, Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh.

The Determination of the Plastic Constants of Metals by the Ultrasonic Pulse Technique—M. B. Reynolds, Knolls Atomic Power Laboratory, General Electric Co., Schenectady, N. Y.

Friday, Oct. 24, 9:30 a.m.

ELEVATED TEMPERATURE PROPERTIES

Temperature Dependence of the Hardness of Pure Metals—J. W. Westbrook, The Knolls, Research Lab., General Electric Co., Schenectady, N. Y.

Hardness of Various Steels at Elevated Temperatures—F. Garofalo, P. R. Malenock and G. V. Smith, Research Laboratory, United States Steel Co., Kearny, N. J.

Some Properties of a Nodular Iron at Elevated Temperatures—M. S. Saunders, graduate student, and M. J. Sinnott, associate professor of chemical and metallurgical engineering, University of Michigan, Ann Arbor, Mich.

Accelerated Strain Aging of Commercial Sheet Steels—L. R. Shoenberger, research engineer, and E. J. Paliwoda, research engineer, Jones & Laughlin Steel Corp., Pittsburgh.

AMERICAN WELDING SOCIETY

Monday, Oct. 20, 10 a.m.

ADAMS LECTURE

The Welding and Brazing of Titanium Alloys—C. B. Voldrich, Battelle Memorial Institute.

Monday, Oct. 20, 2:00 p.m.

(Three simultaneous sessions)

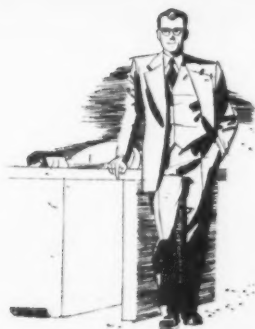
FABRICATING PROCEDURES

Fusion Welding Techniques for Jet Aircraft Components—Arnold S. Rose and Morton A. Braun, I. T. E. Circuit Breaker Co.

Should Preheat Be Substituted for High Temperature Stress Relief in the Codes?—E. Paul DeGarmo, University of California.

Turn to Page 364

A few words about



GRAINAL ALLOYS

and how they are

Metallurgically Engineered

to produce greater uniformity
in your boron treated steels

In our
Laboratories
every aspect of
Grainal Alloys is
carefully studied.



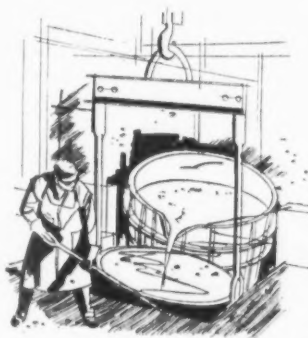
Uniformity. Consistent Results.

These are the demands of today's steelmaker.
To make certain they are answered, we have
metallurgically engineered our Grainal alloys.

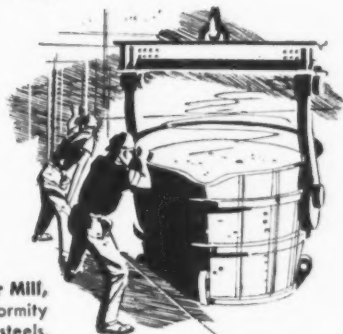
In our laboratories, in our plant, every care is
taken to insure a product of the correct com-
position and highest quality.

Result: A uniform product that enables you to
produce steels of consistently high hardenability
And note—with Grainal you achieve this result
with a minimum boron addition.

In our Plant
exact methods of
production protect
the quality of
Grainal Alloys.



In your Mill,
greater uniformity
in your boron steels.



VANADIUM CORPORATION OF AMERICA



MAKERS OF ALLOYS, CHEMICALS AND METALS

420 Lexington Avenue, New York 17, N. Y.
Detroit • Chicago • Cleveland • Pittsburgh

6 major improvements in Edmont gloves

to fit your job requirements

New flexible NEOX (reinforced neoprene) coating gives firm, easy grip



Never before a chemical and wear-resistant coated glove with such flexibility and grip. Far superior to ordinary neoprene. Most widely applicable of all coated work gloves.

Redmont heavy-duty NEOX gloves have improved safety-grip finish



Finish cured into 30% thicker NEOX coating. Won't chip or peel. Safest glove made. Seamless wearing surface, extra-wide thumb span, curved fingers.

New Grappler plastic gloves far outwear leather, other plastics



Coated with DUROX, 50% longer wearing, non-slip plastic, and made in new wing thumb, pre-flexed finger pattern that perfectly fits the hand.

Hand-fitting Monkey Grips with flexible plastic coating



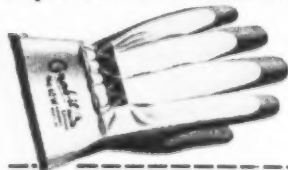
Second only to Grapplers for long wear and made in same pattern. Fits the hand all over; no bagginess; comfortable grip.

New white Sani-Gluv meets special sanitation requirements



Liquid-proof all-white plastic coating in new hand-fitting pattern with wing thumb and pre-flexed fingers.

Improved white-fabric-lined Grab-its, approved by safety directors



Long-wearing, sure-gripping rough finished natural rubber, bonded to new and sturdier white fabric.

Test these gloves at our expense: Send brief description (on business letterhead) of your operations, materials handled and temperature condition. Without cost, we will forward samples of the type gloves we recommend for testing on-the-job. Address

Edmont Manufacturing Company., 1234 Walnut Street, Coshocton, Ohio
World's largest maker of coated industrial gloves

Edmont job-fitted gloves



—Technical Program—

Continued

Chromium-Recovery During Submerged-Arc Welding—James G. Kerr and David A. Elmer, C. F. Braun & Co.

RESISTANCE WELDING

Corrosion of Structural Spot Welds—B. Karnisky, E. P. Gruca and E. Kinelski, Pullman-Standard Car Mfg. Co.

Maintenance of Resistance Welders in High Speed Assembly Lines—James F. Salatin and O. D. Etchison, Delco-Remy Div., General Motors Corp.

HARD FACING AND FLAME HARDENING

Hard Facing Alloys of the Chromium Carbide Type—Howard S. Avery and Henry J. Chapin, American Brake Shoe Co.

Selection and Evaluation of Methods of Hard Facing—Jack J. Barry, Air Reduction Sales Co.

Flame Hardening of Large Diameter Thin Wall Cylindrical Shells—G. S. Wing and G. A. Weber, M. W. Kellogg Co.



Tuesday, Oct. 21, 9:30 a.m.
(Three simultaneous sessions)

RESISTANCE WELDING

Calculation of Spotweld Properties—Julius Heuschkel, Westinghouse Electric Corp.

Temperature Distribution During Flash Welding of Steel—Part II

Ernest F. Nippes, Warren F. Savage, John J. McCarthy and Sheridan S. Smith, Rensselaer Polytechnic Institute.

Spot Welded Titanium-Base Alloy Sheet—M. L. Begeman and Frank W. McBee, Jr., The University of Texas.

Spot Welding Magnesium with Three Phase Low Frequency Equipment—Dear L. Knight and Paul Thorne, National Electric Welding Machines Co., and Paul Klein, Dow Chemical Co.

WELDABILITY

Further Studies of the Crack Sensitivity of Aircraft Steels—A. W. Steinberger and J. Stoop, Curtiss Wright Corp., Propeller Div.

Effect of Geometry on Stresses in Circular Patch Specimen—Alan V. Levy and Harry E. Kennedy, University of California.

Evaluation of the Circular Patch Weld Test—John E. Hackett and L. O. Seaborn, University of California.

Relationship of Welding Technique to Penetration and Dilution—Clarence E. Jackson and Arthur E. Shrubbsall, Union Carbide and Carbon Research Labs.

STRUCTURAL

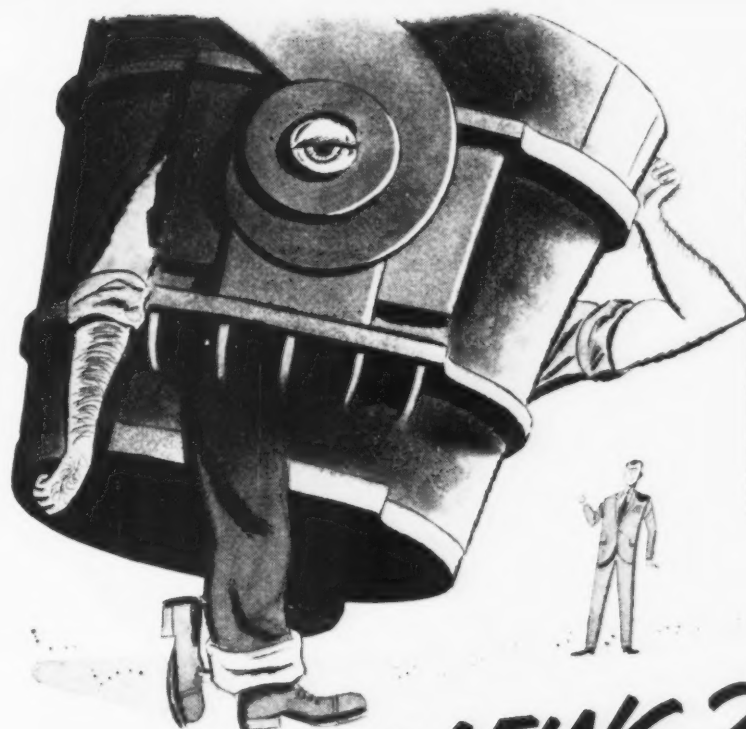
The Behavior of Welded Portal Frames—E. R. Johnston, Lynn S. Beedle, Fritz Engineering Labs., Lehigh Univ., and J. M. Ruzek, C. F. Braun & Co.

Residual Stress and the Compressive Strength of Steel—Lynn S. Beedle, A. W. Huber, Fritz Engr. Labs., Lehigh Univ., and Bruce G. Johnston, University of Michigan.

How to Save Cost by Designing for Structural Welding — Alfred E. Pearson, The Ingalls Iron Works Co.

Distortion Control in Structural Fabrication—Gordon Cape and Llewellyn Jehu, Dominion Bridge Co.

Turn Page



LADLE LOAFING?

Cut control-analysis time 60% and more
with Baird Associates-Dow DIRECT READER

Wet analysis of complex alloys is cumbersome and costly — specifically in lost furnace production and lost heats.

The Baird Associates-Dow DIRECT READING SPECTROMETER keeps furnaces in continuous operation — provides *complete analysis* of ferrous and non-ferrous alloys in *seconds* — quantitative analysis in exact percentages of up to 27 elements in a heat in *less than two minutes*. Average holding time for the complete SAMPLE-ANALYSIS-REPORT cycle... *less than six minutes*.

One DR user saves over \$200,000 a year. Learn how to realize similar savings by using the coupon below.

See the Direct Reader in operation at the NATIONAL METAL CONGRESS
Booth 416, Convention Hall, Phila., October 20-24

*Baird
Associates,
Inc.*

33 UNIVERSITY ROAD
CAMBRIDGE 38, MASS.

BAIRD ASSOCIATES, INC. — Dept. C
33 University Road, Cambridge 38, Mass.

☐ Send further information on the Direct Reader.
☐ We'd like to talk to your Technical Representative.

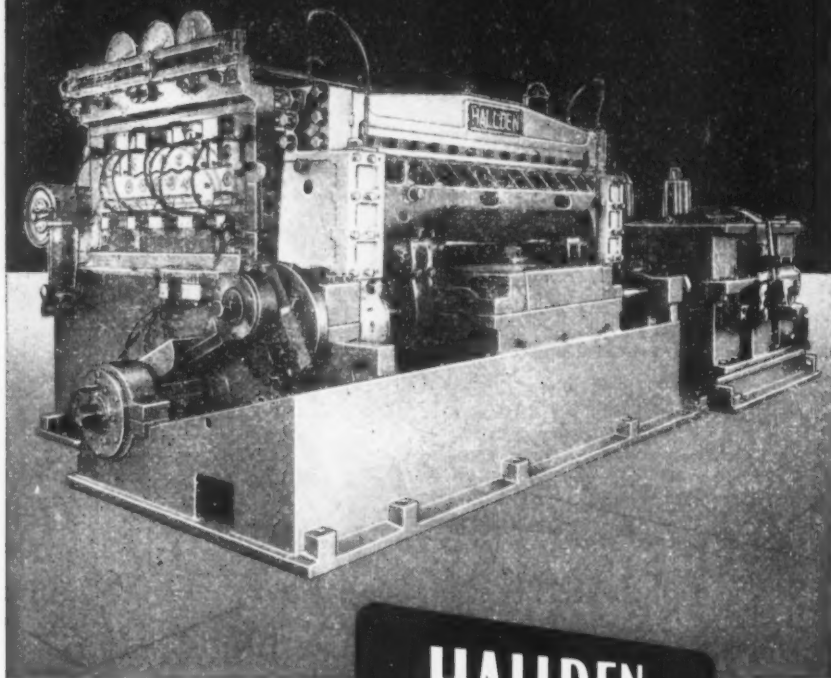
Name _____ Title _____

Firm _____

Address _____

City _____ State _____

SHEAR EFFICIENCY



HALLDEN
Automatic Shears

Hallden Machines are designed to give modern steel mills maximum efficiency in flattening and cutting off operations. They permit continuous feed of metal through the machine at accelerated speeds while maintaining precision cutting accuracy. Low center of gravity, rugged construction and compactness assure uninterrupted operation. Remember, too, that Hallden Shears are completely automatic.

Take your shearing problems to Hallden, the shearing specialists.

THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT

Sales Representatives

The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

Technical Program

Continued

Tuesday, Oct. 21, 2:00 p.m.
(Three simultaneous sessions)

WELDABILITY

The Effect of Strain Rate on Twinning and Brittle Fracture in Low Carbon Steel—D. Rosenthal and C. C. Woolsey, Jr., University of California.

Interpretation of Test Data Regarding Brittle Strength and Transition Temperature of Structural Steel—N. M. Newmark and W. C. Heltje, University of Illinois.

Factors Affecting the Structural Steel in Repeated Overloading—Robert D. Stout, John H. Gross and Dogan Gucer, Lehigh University.

RESISTANCE WELDING

Quality Control of Resistance Welding by Statistical Methods—J. F. Radford and R. K. Waldvogel, Crosley Division, Avco Mfg. Corp.

Contact Resistance as Affected by Subdividing the Contact Area—Wm. B. Kouwenhoven and Clarence W. Little, Jr., The Johns Hopkins Univ.

New Multi-Spot Control Provides Increased Welding Production with Limited Power Supply—Claude R. Whitney, Jr., Square D. Co.

BRAZING AND BRONZE WELDING

New Aspects in Surface Alloying in Brazing and Related Techniques—



"I want you all to get into that Metal Show and fight."

Dr. Robert Humphrey and Rene D. Wasserman, Eutectic Welding Alloys Corp.

Strength Joints to Steel with Aluminum Bronze Filler Metals—Willis G. Groth, Ampeco Metal, Inc.

Tuesday, Oct. 21, 4:30 p.m.
Educational Lecture Series

Inert Gas Metal Arc Welding Processes—Walter H. Wooding, Philadelphia Naval Shipyard.

Wednesday, Oct. 22, 9:30 a.m.
(Two simultaneous sessions)

NON-FERROUS

The Semiautomatic Inert-Gas Metal-Arc Welding of Aluminum Alloys—Charles T. Gayley, Joseph R. Girini and Walter H. Wooding, Industrial Test Laboratory, Philadelphia Naval Shipyard.

Welding 90-10 Cupro-Nickel by the Inert Gas Shielded Arc Processes—L. H. Hawthorne, Revere Copper and Brass, Inc.

Weld Cracking of Aluminum Alloys—James D. Dowd, Aluminum Co. of America.

WELDABILITY

Relation of Preheating to Low-Temperature Cooling Rate Embrittlement and Microcracking — A. E. Flanigan and T. Micleu, University of California.

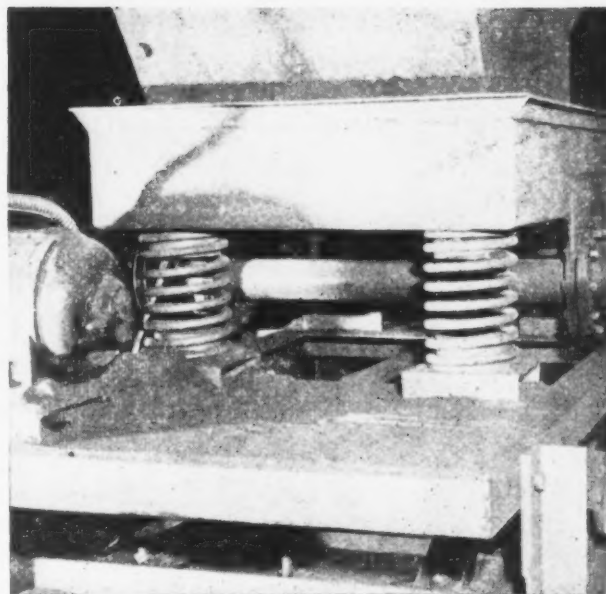
Initiation and Propagation of Brittle Fracture in Structural Steels—Peter P. Puzak, Earl W. Eschbacher and William S. Pellini, Naval Res. Lab.

The Continuous Cooling Transformation of Weld Heat-Affected Zones—W. R. Applett, L. K. Poole and W. S. Pellini, Naval Research Lab.

The Determination of Optimum Welding Conditions for the Automatic Welding of High Hardenability Steels, With or Without Preheat—C. R. McKinsey and J. F. Collins, Union Carbide & Carbon Res. Labs., Inc.

Turn Page

HEWITT-ROBINS



SIMPLIFIES VIBRATING FEEDER PROBLEMS

Hewitt-Robins Vibra-Feeder . . . First Practical Fully Mechanical Vibrating Feeder

Simple To Operate: Completely automatic. Just push a button and start feeding—requires no attention or adjustment—can't be overloaded with standard hopper design—won't dampen out—some sizes draw only 2 amps.

Simple Construction: Vibrating mechanism is *fully mechanical*—small and compact—completely dust-tight—practically noiseless. *Only electricals . . . an AC or DC 1 HP motor and a simple light-duty plug and receptacle.*

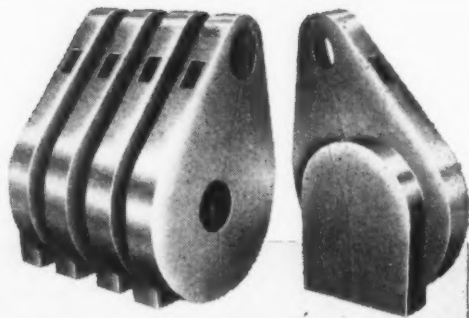
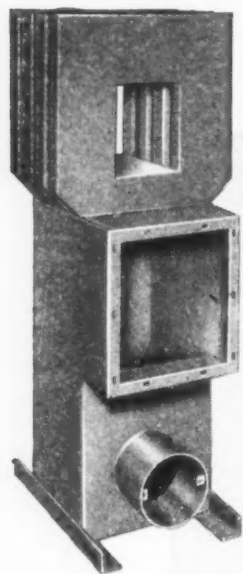
Full Range Of Sizes: Available from 24" to 48" wide and 48" to 144" long; also other sizes to meet your specifications.

Write for Bulletin 134 for complete information.

HEWITT-ROBINS  **INCORPORATED**
STAMFORD CONNECTICUT

Hewitt Rubber Division
Hewitt Restfoam Division

Robins Conveyors Division
Robins Engineers Division



SHEET METAL FABRICATION

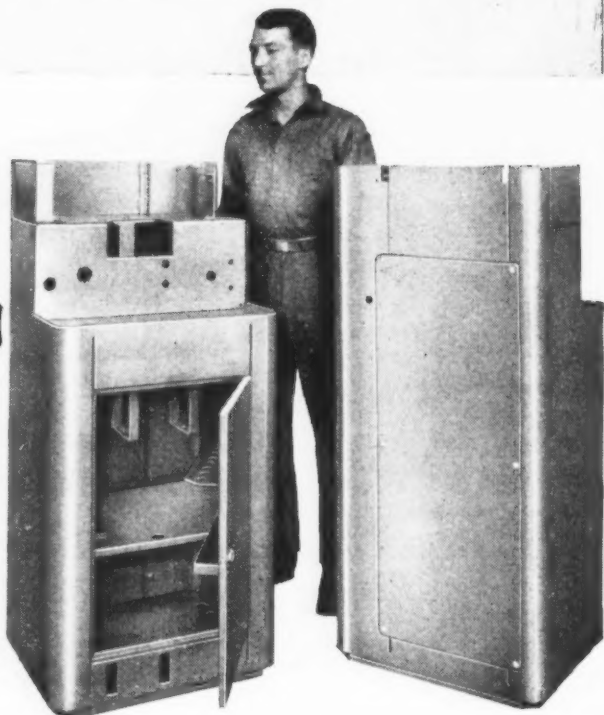
BY

KIRK AND BLUM

*Contract
Manufacturing
Facilities*

- Tanks
- Spare Parts Boxes
- Panel Boards
- Machine Bases, Pedestals and Frames
- Hoppers
- Electrical Enclosures
- Guards
- Rolled Steel Rings
- Racks • Pans
- Stampings
- Louvre Panels
- Cabinets

Write for
New Bulletin F-3,
SHEET & PLATE
FABRICATION



Whatever your requirements in sheet, plate and alloy fabrication, Kirk & Blum can produce for you . . . economically and quickly.

Complete facilities to $\frac{1}{2}$ " capacity for square and rotary shearing, braking, forming, rolling, punching, riveting, welding, grinding, drilling and finishing sheets and light plates and structurals.

For complete details, write for literature on fabrication facilities and experience or send prints to:

THE KIRK AND BLUM MANUFACTURING COMPANY
3200 FORRER STREET • CINCINNATI 9, OHIO

KIRK AND BLUM METAL FABRICATION

—Technical Program—

Continued

Wednesday, Oct. 22, 2:00 p.m.
(Three simultaneous sessions)

WELDABILITY

Embrittlement of High Strength Ferritic Welds—Peter P. Puzak and William S. Pellini, Naval Research Laboratory.

Temper Brittleness in Low Alloy Weld Metal—Richard P. Wentworth and Hallock C. Campbell, Arcos Corp.

The Effects of Electrodes and Welding Conditions on the Ductility of Arc Welded Mild Steels—Ernest F. Nippes and Alexander Lesnewich, Rensselaer Polytechnic Institute.

NON-FERROUS

The Strength and Ductility of Welds in Aluminum Alloy Plate—F. M. Howell and F. G. Nelson, Jr., Aluminum Research Laboratories.

Factors Which Determine the Performance of Aluminum Alloy Weldments—W. R. Appleby, C. R. Felmlay and W. S. Pellini, Naval Research Lab.

Welding and Forming of Titanium—Francis H. Stevenson, Aerojet Engineering Corp.

MAINTENANCE AND GAS CUTTING

Wear and Operation Problems in Maintenance—Frank J. Gaydos, U. S. Steel Co., Gary Works.

Effect of Oxygen Cutting on Alloy Steel—F. C. Saacke, Air Reduction Co., Inc.

Wednesday, Oct. 22, 4:30 p.m.
Educational Lecture Series

Inert Gas Metal Arc Welding Processes—Walter H. Wooding, Philadelphia Naval Shipyard.



"Unusual atmosphere in Philadelphia, eh?"

Thursday, Oct. 23, 9:30 p.m.
(Three simultaneous sessions)

INERT ARC WELDING

Comparison of Shielding Mixtures for Gas Shielded Arc Welding—John W. Cunningham, Air Reduction Sales Co.

Production Welding of Mild and Low Alloy Steels by Gas Shielded Arc Welding—John H. Berryman, Air Reduction Sales Co.

Porosity in Mild Steel Weld Metal—Donald Warren, E. I. du Pont de Nemours & Co., and R. D. Stout, Lehigh University.

BRAZING

Advanced Information for the Brazing Operator—E. F. Davis, Westinghouse Electric Corp.

Joint Design for Brazing—W. J. Van Natten, General Electric Co.

Technical Aspects of Soldering Practices—R. M. MacIntosh, Tin Research Institute, Inc.

Production Brazing — J. R. Wirt, Delco-Remy Div., General Motors Corp.

MARINE CONSTRUCTION

New Rules for Welding Low Alloy Ferritic Pipe Material — Commander Charles F. Perry, USCG.

Evaluation of Brittle Failure Research — Paul Pfiehl and Ed Sweeney, Bethlehem Steel Company.

An Investigation on Peening—G. W. Place, American Bureau of Shipping.

Friday, Oct. 24, 9:30 a.m.
(Three simultaneous sessions)

PIPE

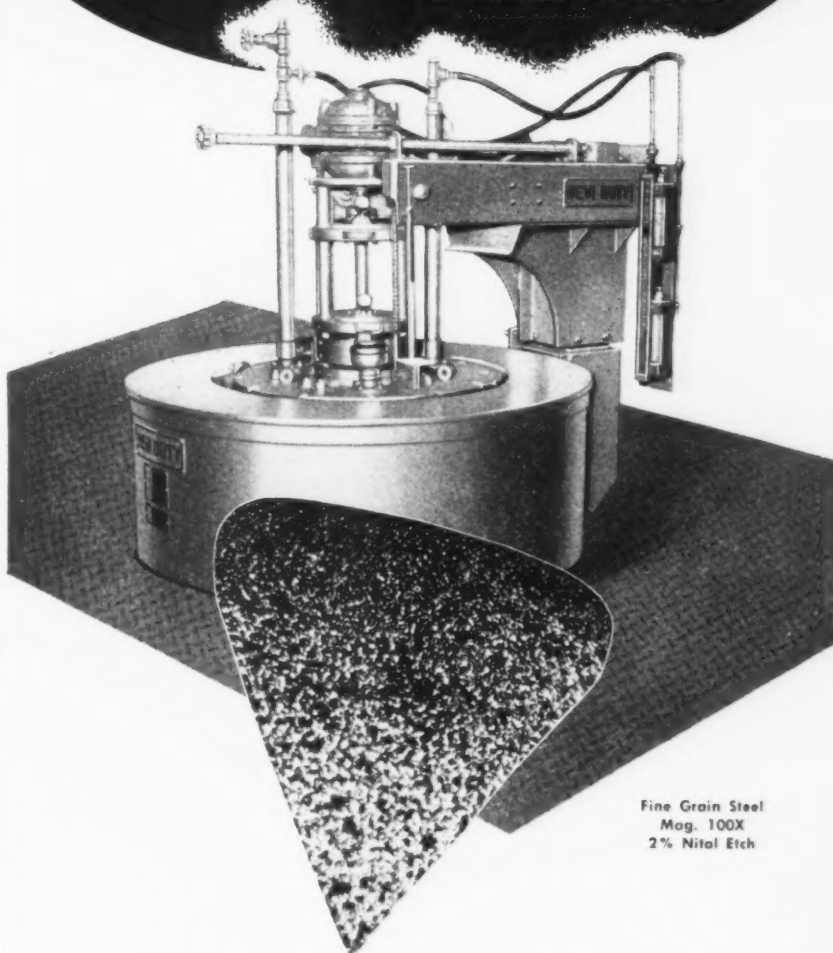
Pipe Welding in the Petroleum Refining Industry—Albert W. Zeuthen, Socony Vacuum Oil Company.

The Arc Welding of Low Chromium Molybdenum Steel Pipe—J. Bland, L. J. Privoznik and F. J. Winsor, Standard Oil Co. of Indiana.

Effect of Stresses and Stress Relief on the Bursting Strength of Circumferentially Welded Pipe—L. J. Privoznik and F. J. Winsor, Standard Oil Company of Indiana.

Turn Page

CARBON CONTROL in the CARBURIZING PROCESS



Fine Grain Steel
Mag. 100X
2% Nital Etch

Time — Temperature — Carburizing Medium — Circulation — these have been accepted as essentials of the gas carburizing process. Now a 5th factor — Pressure — is established as being of primary importance. **POSITIVE PRESSURE CARBURIZING** has simplified the control of the amount and distribution of carbon in the case. Uniform results from heat to heat are realized — not only can the desired carbon concentration be obtained on the surface of the work but also to specified depths below the surface. Finish grinding may be performed without loss of uniformity of surface hardness — or may be eliminated entirely.

Hevi Duty Carburizer-Nitrider Furnaces are now equipped for controlled pressure carburizing. Inexpensive accessories can be provided to convert existing Hevi Duty Carburizers into controlled pressure carburizers to give you true carbon control.

Consult your nearest Hevi Duty Office for more information —

Eastern District
50 Journal Square
Jersey City 6, N. J.

Cleveland District
1979 Union Commerce Bldg.
Cleveland 14, Ohio

Chicago District
205 W. Wacker Drive
Chicago 6, Illinois

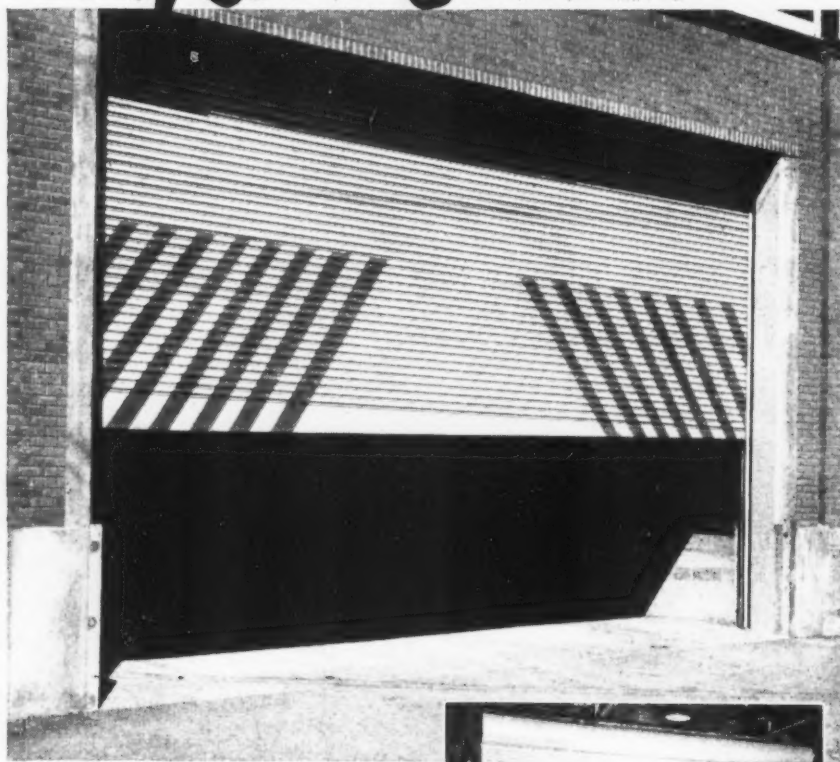
HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

KINNEAR Rolling Doors



Greater Efficiency
SAVES
Time, Space, and Money

Every Kinnear Door is tailored to fit the individual opening, in old or new buildings. Coiling neatly above the lintel, they open straight up — can't interfere with traffic or other plant activity. A half-century of use under the most difficult conditions gives complete proof of the Kinnear Door's capacity for years of hard, constant service.

They save money because their rugged, all-steel, interlocking slat curtain assures long life and low maintenance costs, plus extra protection against fire, intrusion, or wind damage. Slat surfaces are heavily zinc coated by the hot-dip

process, and a special Kinnear Paint Bond is applied to assure lasting paint adhesion.

They save space by opening straight up and coiling above the doorway, allowing all floor and wall space around the door to be used at all times.

They save time with their smooth, easy, gliding action. With motor operation, doors can be fully and safely controlled by push-buttons from any number of convenient locations.

Write for your copy of new catalog.



The KINNEAR Manufacturing Company

FACTORIES:
1760-80 Fields Ave.,
Columbus 16, Ohio
1724 Yosemite Ave.,
San Francisco 24, Calif.
Offices and Agents in Principal Cities

Saving Ways in Doorways

KINNEAR
ROLLING DOORS

Technical Program

Continued

INERT ARC

Inert Gas Shielding of the Metallic Arc—William L. Green and Robert J. Krieger, The Ohio State University.

Gas Flow Requirements for Inert Gas Arc Shielding—Glenn J. Gibson, Air Reduction Company, Inc.
Shielded Arc Welding of Jet Engine Components — K. H. Koopman, Linde Air Products Company.

MARINE CONSTRUCTION

Observations on Experience with Welded Ships — David P. Brown, American Bureau of Shipping.
Prevention of Marine Corrosion by Metallizing Systems — Howard Vanderpool, Metallizing Engineering Co.

Failure and Defects Encountered in Welded Ship Construction—Ralph D. Bradway, New York Shipbuilding Corp.

INSTITUTE OF METALS DIVISION—AIME

Monday, Oct. 20, 9:00 a.m.

THERMODYNAMIC AND THERMAL PROPERTIES

Scaling of Lead in Air—Elmer Weber, Chase Brass and Copper Co., and W. M. Baldwin, Jr., Case Institute of Technology.

Concentration Dependence of Diffusion Coefficients in Metallic Solid Solutions—D. E. Thomas, Westinghouse Atomic Power Division, and C. E. Birchenall, Carnegie Institute of Technology.

Thermodynamic Properties of Solid Nickel-Gold Alloys—L. L. Seigle, Sylvania Electric Products, Inc., M. Cohen, and B. L. Averbach, Massachusetts Institute of Technology.



"What makes you think we can't ship next week?"

transformation in Cobalt-Nickel Alloys—J. B. Hess, Kaiser Aluminum and Chemical Corp., and C. S. Barrett, University of Chicago.

Principles of Zone-Melting—W. G. Pfann, Bell Telephone Laboratories.

Segregation of Two Solutes, with Particular Reference to Semiconductors—W. G. Pfann.

HIGH TEMPERATURE

Some Observations of Sub Grain Formation During Creep in High Purity Aluminum—I. S. Servi, Union Carbide & Carbon Corp., J. T. Norton and N. J. Grant, Massachusetts Institute of Technology.

Observations of Creep of the Grain Boundary in High Purity Aluminum—H. C. Chang and N. J. Grant, Massachusetts Institute of Technology.

Creep Correlations in Alpha Solid Solutions of Aluminum—O. D. Sherby and J. E. Dorn, University of California.

Effect of Zirconium on Magnesium-Thorium and Magnesium-Thorium-Cerium Alloys—T. E. Leontis, Dow Chemical Co.

Influence of Chemical Composition on the Rupture Properties at 1200°F of Wrought Cr-Ni-Co-Fe-Mo-W-Cb Alloys—E. E. Reynolds, Allegheny-Ludlum Steel Corp., and J. W. Freeman and A. E. White, University of Michigan.

High Temperature Oxidation of Some Iron Chromium Alloys—D. Caplan and M. Cohen, National Research Council, Ottawa.

Mechanical Properties of Intermetallic Compounds at Elevated Temperatures—Robert Lowrie, Lewis Flight Propulsion Laboratory.

Tuesday, Oct. 21, 9:00 a.m.

SYMPOSIUM ON TITANIUM AND TITANIUM ALLOYS DEFORMATION

Dynamic Formation of Slip Bands in Aluminum—N. K. Chen and R. B.

Turn Page

October 9, 1952


WILLSON®

comfortable
eye protection



keep you on the safe side

WILLSON GOGGLES

Willson goggles offer you greatest value because they are carefully designed for comfort and appearance as well as for the eye protection you need. Choose from a wide range of Cup and Cover-All® types like those illustrated. All are fitted with Super-Tough® heat-treated glass lenses—all fully pre-tested. You're sure when you ask for Willson goggles—safer when you wear them.



**COVER-ALL®
CUP GOGGLE No. CC60**

Heavy duty goggles allowing plenty of room for prescription glasses to be worn safely and comfortably.



**RUBBER MASK
GOGGLE No. X41**

Ideal for chemical workers. Rolled inner edge makes them fit snugly with utmost ease.



**STYLE
DL31**

Deep perforated metal cups provide direct ventilation yet exclude dust. Ideal for use in hot, dusty atmospheres.

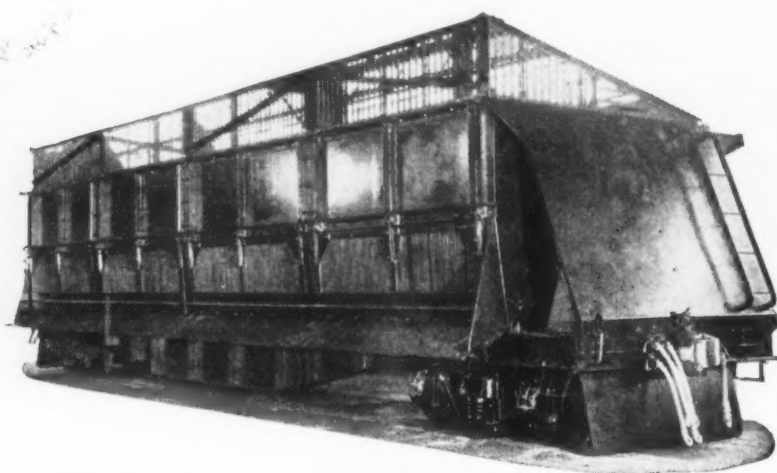
See your WILLSON distributor or write for bulletin

WILLSON PRODUCTS, Inc., 231 Washington St., Reading, Pennsylvania

50 Years of KNOW-HOW

For more than 50 years Atlas has been designing coke oven machinery of acknowledged excellence. Coal Charging Cars, Coke Quenching Cars, Door Extractors and Coke Guides *must* be built with "know-how" to produce best operating results and lowest maintenance. Let Atlas quote on your needs.

ATLAS CARS



COKE QUENCHING CAR

The latest Atlas Quenching Cars have longer life with lower maintenance than previous types. Their cost also is lower. This is due to the welded "corrosion-resisting" frame of heavier material with fewer joints and all joints welded-sealed together with the use of abrasion resisting floor plates, which outwear cast plates and cost much less to replace. There is no welding on Atlas abrasion resisting floor plates. The improved door operating mechanism is sealed against the entrance of coke dust and water and is simplified to eliminate the troublesome line shafts. Coke deflectors are provided at each end. Air hoses are armor-clad. Gates generally are of steel bars arranged for easy replacement. Cars are supplied with or without upper coke racks.

Custom Builders of Coke Oven Equipment



THE ATLAS CAR & MFG. CO.

ENGINEERS

MANUFACTURERS

1140 IVANHOE RD.

CLEVELAND 10, OHIO, U. S. A.

—Technical Program—

Continued

Pond, Johns Hopkins University.
Observations on the Tension Texture of Aluminum—E. A. Calnan and Betty E. Williams, National Physical Laboratory.

Deformation of Zinc Bicrystals by Thermal Ratcheting—J. E. Burke and Anna M. Turkalo, General Electric Co.

Surface Effects in the Slip and Twinning of Metal Monocrystals—J. J. Gilman, and T. A. Read, Columbia University.

Bend Plane Phenomena in the Deformation of Zinc Monocrystals—J. J. Gilman, General Electric Co., and T. A. Read, Columbia University.

Kinking in Zinc Single Crystal Tension Specimens—Jack Washburn and E. R. Parker, University of California.

Tuesday, Oct. 21, 2:00 p.m.

**SYMPOSIUM ON TITANIUM AND TITANIUM ALLOYS
DEFORMATION—(Cont'd)
PHYSICAL METALLURGY**

Development of Mechanical and Magnetic Hardness in a 10 pct Vanadium-Cobalt-Iron Alloy — R. W. Fountain, Union Carbide and Carbon Corp., and J. F. Libsch, Lehigh University.

Observations on Nodular Graphite—H. M. Weld, R. L. Cunningham, and F. W. C. Boswell, Department of Mines and Technical Surveys.



"The customers keep buying the new ones; this is the only thing we had around the shop."

Crystallization Kinetics of Low Carbon Steel—S. F. Reiter, General Electric Co.

Effect of Molybdenum and of Nickel on the Rate of Nucleation and the Rate of Growth of Pearlite—R. W. Parcel, Rem-Cru Titanium, Inc., and R. F. Mehl, Carnegie Institute of Technology.

Effect of Applied Stress on the Martensitic Transformation — S. A. Kulin, Westinghouse Atomic Power Division, and M. Cohen, and B. L. Averbach, Massachusetts Institute of Technology.

A Study of Grain Shape in an Aluminum Alloy and Other Applications of Stereoscopic Microradiography —W. M. Williams, Revere Copper and Brass Co., and C. S. Smith, University of Chicago.

Wednesday, Oct. 22, 2:00 p.m.

TITANIUM

Titanium-Chromium Phase Diagram —F. B. Cuff, N. J. Grant, and C. F. Floe, Massachusetts Institute of Technology.

Titanium-Copper Binary Phase Diagram—A. Joukainen, E. I. du Pont de Nemours & Co., Inc., and N. J. Grant and C. F. Floe, Massachusetts Institute of Technology.

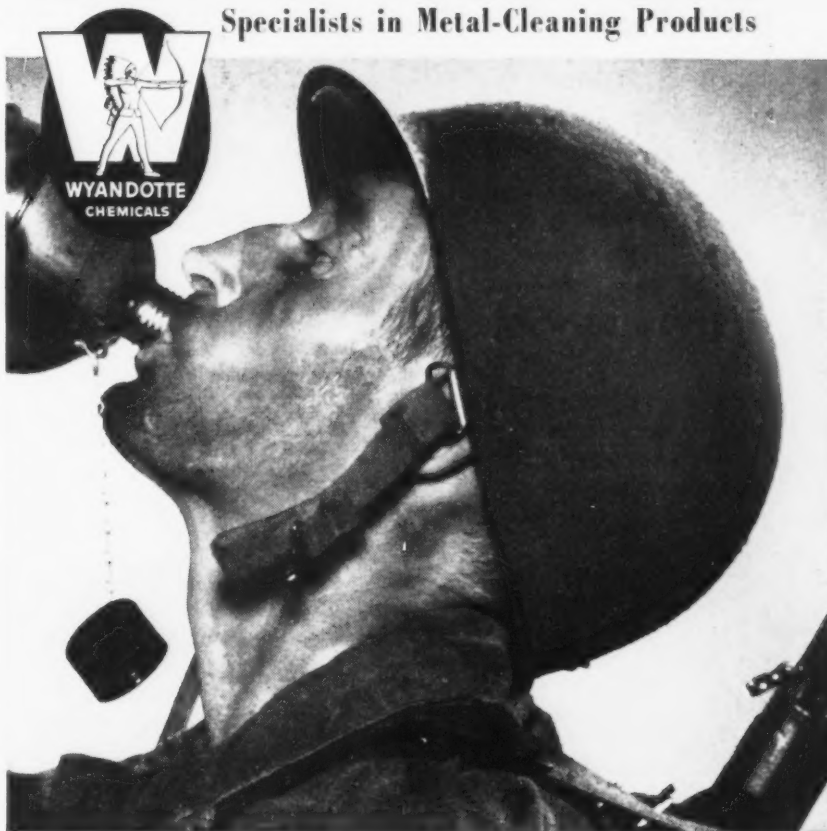
Titanium-Aluminum System —E. S. Bumps, H. D. Kessler, and M. Hansen, Armour Research Foundation of Illinois Institute of Technology.

Turn Page



"I'm afraid you fellows have ruined the exhibit."

Specialists in Metal-Cleaning Products



U. S. Army helmet. Wyandotte makes only the emulsion cleaner used in making this helmet.

"Excellent cleaning with WYANDOTTE emulsion cleaner"

—says army-helmet manufacturer

WHEN McCord Corporation of Detroit tackled the job of mass-producing hundreds of thousands of army helmets, they knew it was going to be a tough job. Many experts said these deep helmets couldn't be shaped of Hadfield steel in one press operation.

But McCord, the original supplier and builder of over 20 million army helmets, did the job . . . a testimony to their metal-working genius and attention to detail. That's why we're proud of our association with McCord.

Helpful Service

In their metal-cleaning operations, McCord uses Wyandotte emulsion

cleaner. Mr. Dean S. Fields, vice-president in charge of manufacturing, says: "Wyandotte emulsion cleaner gives us excellent results in cleaning army helmets prior to painting."

About Wyandotte service, Mr. Fields adds: "It's always a pleasure to have your man come into our plant."

Why not call *your* Wyandotte representative? His wide experience is certain to be useful to you, whatever your metal-cleaning problems. Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 54, California.



Largest manufacturers of specialized cleaning products for business and industry

 **Wyandotte**
CHEMICALS

Helpful service representatives in 138 cities in the United States and Canada

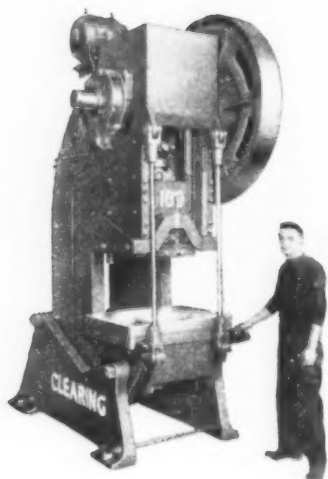


Jim Carns didn't learn it from his Dad

The Carns hardware store has been on the same corner for eighty years, and Jim is the third generation proprietor. His father died in 1927. Things have changed in the hardware business since then.

Jim's father avoided stamped articles because in his day they were often flimsy and inaccurate—"ten cent store stuff." Today, pressed metal parts can be made strong, rigid, and to close tolerances. They're smooth, light in weight, low in cost—no wonder the public prefers them.

Clearing presses have contributed greatly to this revolution in the manufacture of metal parts. If you are making metal objects by some slower, more costly process, it will pay you to investigate modern press methods. Ask a Clearing engineer to show you possible adaptations to manufacture your product at minimum cost—on a Clearing press.



**CLEARING
PRESSES**



CLEARING MACHINE CORPORATION

6499 WEST 65th STREET • CHICAGO 38, ILL.
HAMILTON DIVISION, HAMILTON, OHIO

THE WAY TO EFFICIENT MASS PRODUCTION

Technical Program

Continued

Observations on the Lattice Parameters of the Alpha and TiO Phases in the Titanium-Oxygen System—W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

Nature of the Line Markings in Titanium and Alpha Titanium Alloys—C. M. Craighead, G. A. Lenning, and R. I. Jaffee, Battelle Memorial Institute.

Time-Temperature-Transformation Characteristics of Titanium-Molybdenum Alloys—D. J. DeLazaro, M. Hansen, R. E. Riley, and W. Rostoker, Armour Research Foundation of Illinois Institute of Technology.

Compression Texture of Iodide Titanium—D. N. Williams, and D. S. Eppelsheimer, Missouri School of Mines and Metallurgy.

Partial Titanium-Vanadium Phase Diagram—Paul Pietrowsky, and Pol Duwez, California Institute of Technology.

CONSTITUTIONAL DIAGRAMS

Tungsten-Cobalt-Carbon System—Pekka Rautala, and J. T. Norton, Massachusetts Institute of Technology.

Role of the Binder Phase in Cemented Tungsten Carbide-Cobalt Alloys—Joseph Garland, Firth Sterling Steel & Carbide Corp., and J. T.



"It's a new model for the younger generation."

Norton, Massachusetts Institute of Technology.

Solubility of Carbon and Oxygen in Molybdenum—W. E. Few, and G. K. Manning, Battelle Memorial Institute.

System Molybdenum Boron and Some Properties of the Molybdenum Borides — Robert Steinitz, Ira Binder, and David Moskowitz, American Electro Metal Corp.

Systems Zirconium-Molybdenum and Zirconium-Wolfram — R. F. Domagala, D. J. McPherson, and M. Hansen, Armour Research Foundation of Illinois Institute of Technology.

Copper-Zinc Constitution Diagram Redetermined in the Vicinity of the Beta Phase by Means of Quantitative Metallography — Lillian Beck, and C. S. Smith, University of Chicago.

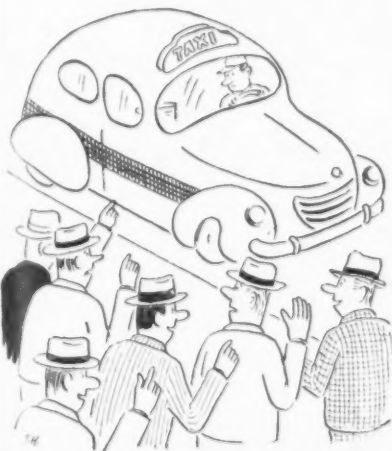
Intermediate Phases in the Mo-Fe-Co, Mo-Fe-Ni, and Mo-Ni-Co Ternary Systems—D. K. Das, Notre Dame University, S. P. Rideout, E. I. du Pont de Nemours Argonne National Laboratory, and P. A. Beck, University of Illinois.

SOCIETY FOR NON-DESTRUCTIVE TESTING

Monday, Oct. 20, a.m.

MODERN X-RAY EQUIPMENT

The General Electric Industrial Beta-tron—T. W. Dietze, General Engineering
Turn Page



"Sorry Bud, if you're not going to the Metal Show you're not going anywhere."

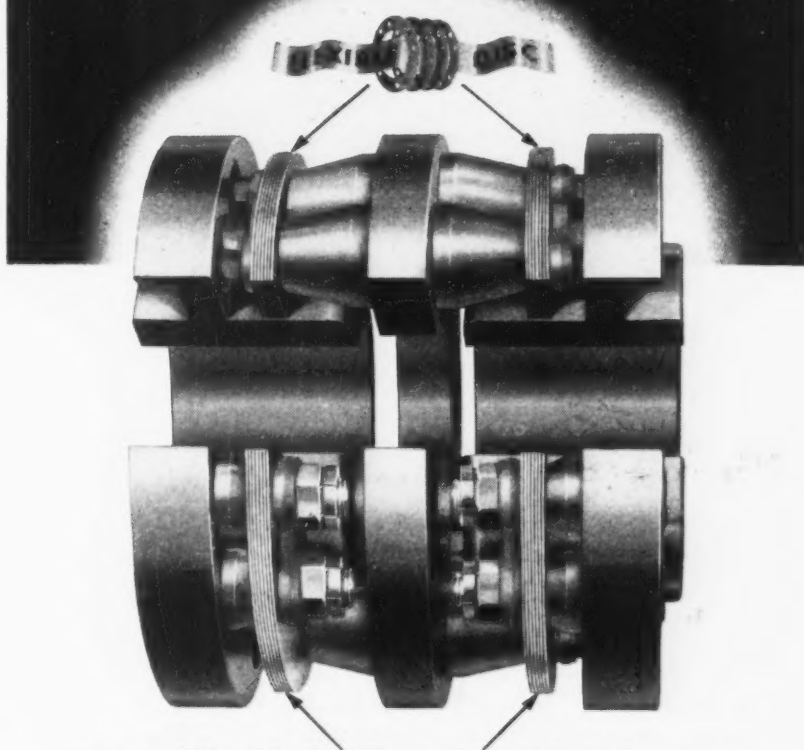
October 9, 1952

AVOID COSTLY SHUT-DOWNS!

prolong the life of your machines with Thomas Couplings

DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS

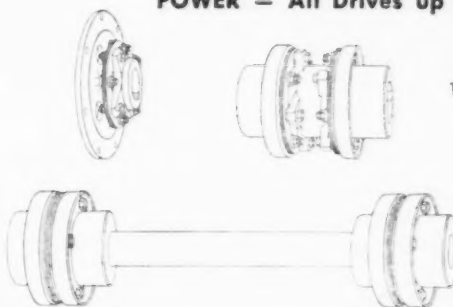
GREATEST ECONOMY	No Maintenance Pays for Itself
NO LUBRICATION	No Wearing Parts Human Element Eliminated
NO BACKLASH	All Parts Solidly Bolted No Loose Parts
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

SPEEDS — All Speeds up to 30,000 RPM.

POWER — All Drives up to 40,000 HP.



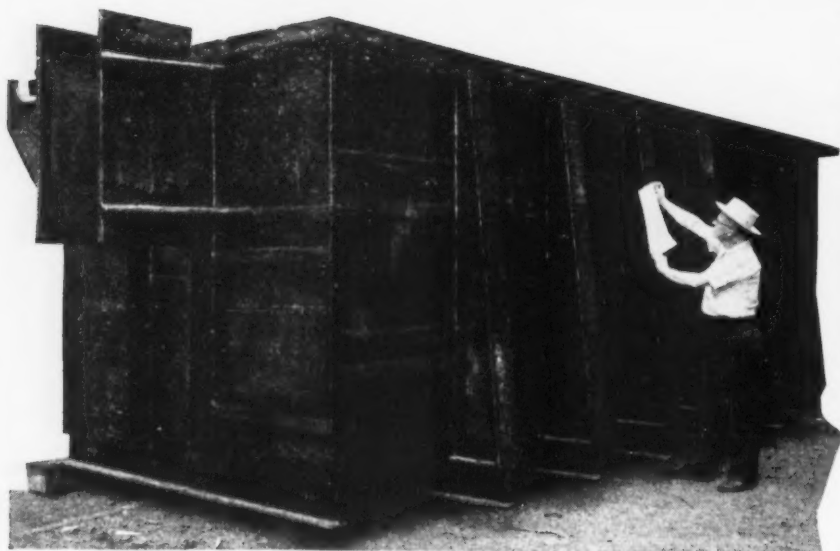
THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

MANUFACTURERS OF FLEXIBLE COUPLINGS ONLY FOR OVER 35 YEARS

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.



There is a
PYROFLEX CONSTRUCTED TANK
for
EVERY CORROSIVE SOLUTION



Two courses of acid proof brick set in Knight acid proof cement are installed over Pyroflex lining in pickling tank.

Every Pyroflex-Constructed Tank is individually engineered to do a specific job. For example, the pickling tank above must handle a hot sulphuric acid solution. A steel shell was lined with a heat-bonded Pyroflex sheet membrane. Two courses of acid-proof brick set in Knight No. 2 Acid-Proof Cement were installed. Exterior surfaces were covered with Pyroflex. The result is a tank completely resistant inside and out to the corrosive conditions under which it must function.

Tanks for pickling stainless must handle nitric and hydrofluoric acid. Suitably constructed tanks are also built for this service. Pyroflex Construction is not limited to the use of any particular materials. Each unit is constructed of whatever materials best meet individual requirements. Thus, you are assured of a tank tailor made to fit your job — to give long trouble-free service with less maintenance and down time. Pyroflex-Constructed Tanks can be shipped F.O.B. Akron, or lined on the job site by skilled field crews.

Write for Bulletin No. 2T, Pyroflex Construction.

Maurice A. Knight, 310 Kelly Ave., Akron, Ohio
Acid and Alkali-proof Chemical Equipment

Technical Program

Continued

neering Laboratory, General Electric Co.

Modern Techniques in Precision High-Voltage Radiography — E. Alfred Burrill, High-Voltage Engineering Corp.

Uses of Low-Voltage X-Ray Tubes With Thin Beryllium Windows in Nondestructive Testing — Tom H. Rogers, Machlett Laboratories.

The Current Status of the Picker-Polaroid Process for One-Minute Radiography in the Industrial Field — W. B. Pyle, Picker X-Ray Corp.

Alternate: Direct Exposure Enlargement Techniques in Radiography and Fluoroscopy Utilizing Fractional-Focus X-Ray Tubes — Leo C. Kotraschek, North American Philips Co., Inc.

Monday, Oct. 20, p.m.

NEW TECHNIQUES FOR X-RAY TESTS

Reduction of Exposure Time in Gamma Radiography — J. J. Hirschfield and D. T. O'Connor, Naval Ordnance Laboratory.


Techniques Used in Measuring Uniformity of Materials by Means of Gamma Radiation — Lawrence R. Megill and John N. Harris, Los Alamos.

Some Industrial Applications of Micro-Radiography — S. Goldspiel and F. Bernstein, N. Y. Naval Shipyard.

Turn to Page 379



"The convention people are a little worried about this demonstration."



**best way
to seal big
gas mains**

Another good example of Salem-Brosius leadership in diversified service to the ferrous and non-ferrous metals industries is the specially designed Brosius-Westling plate valve shown above. This ingenious mechanism is an offspring of the traditional "goggle" valve which has long been used to close massive mains containing dangerous gasses around blast furnaces and steel mills. Its major virtues are rapid shut-off and seal; easy, positive action despite long intervals of disuse; high structural strength combined with relative low weight. The development of the Brosius-Westling has so refined the principal of the sliding-plate valve that other industries currently are experimenting with its application.

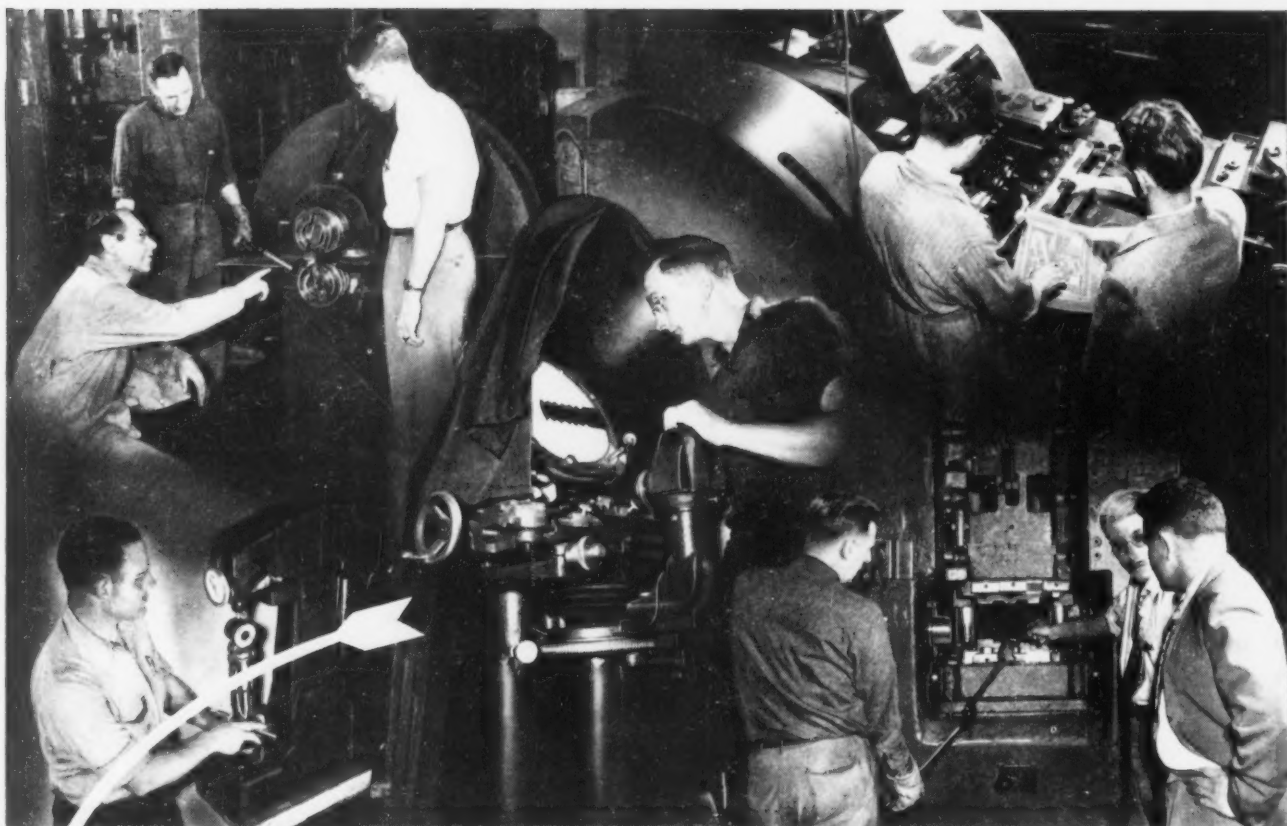
If you have a problem which involves the use of heating furnaces, blast furnace equipment, or charging and manipulating machines, it will pay you to call on Salem-Brosius today.

SALEM-BROSIUS, INC.

SALES AND EXECUTIVE OFFICES: 248 FOURTH AVENUE, PITTSBURGH 22, PA.

BROSIUS DIVISION, PITTSBURGH 15, PA.

SALEM ENGINEERING DIVISION, SALEM, OHIO



NATIONAL . . . Your Forging Laboratory!

Out of this unique "forging laboratory" have come many significant advancements . . . the high speed forging press . . . modern horizontal Forging Machine . . . blank-preforming Reduceroil . . . Semi-Hot Rivet Header . . . Boltmaker . . . roll-over transfer Cold Nut Former . . . Automatic Precision Nut Tapper . . . Nail-Maker . . . Cold Headers for bearing rollers and balls, for tubular and solid rivets, and thousands of other parts . . .

In addition, we've been continually developing new forging applications and methods right along . . . establishing basic principles of die design as influenced by metal flow, both hot and cold . . . upsetting . . . deep piercing . . . extrusion . . .

Some of *tomorrow's* top developments in the forging field are now on our drawing boards and test floors!



NATIONAL

MACHINERY COMPANY
TIFFIN, OHIO.

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES—MAXIPRESSES—COLD HEADERS—AND BOLT, NUT, RIVET, AND WIRE NAIL MACHINERY

Hartford

Detroit

Chicago

—Technical Program—

Continued

Gaging Tin Coatings in the Steel Industry by X-Ray Fluorescence Analysis—C. J. Woods, North American Phillips Co., Inc.

Alternate: Application of Fluorescence X-Rays to Metallurgical Microradiography—Herman E. Seeman and H. R. Spletstosser, Eastman Kodak Co.

Alternate: Radiography With Iridium 192—James V. Rigbey, Ford Motor Co. of Canada.

Tuesday, Oct. 21, a.m.

CONTROL AND INTERPRETATION IN X-RAY TESTING

Film Characteristics as Applied to Radiation Monitoring—George Corney, Eastman Kodak Co.

Problems of Mechanical Film Development—Donald F. Hauptman and Gerold H. Tenney, Los Alamos.

Various Penetrameter Types and Their Limitations—Norman C. Miller and Gerold H. Tenney, Los Alamos.

Interpretation of Radiographs of Aluminum and Magnesium Castings—J. J. Pierce, Naval Ordnance Laboratory.

Interpretation of Fluoroscopic Images of Aluminum and Magnesium Castings—D. T. O'Connor and D. Polaasky, Naval Ordnance Laboratory.



"They are stabilized but we don't guarantee freedom from sigma unless you follow austenitizing procedures outlined by Smith, Brown, et. al."

You're "WIRED to SATISFACTION" when you specify SENECA



TOP QUALITY WIRE

for wide range of uses! Check your needs!

- | | | |
|--------------------------------------|---|--|
| <input type="checkbox"/> Aircraft | <input type="checkbox"/> Curtain Spring | <input type="checkbox"/> Plow Steel |
| <input type="checkbox"/> Armor | <input type="checkbox"/> Drapery Pin | <input type="checkbox"/> Reed |
| <input type="checkbox"/> Armature | <input type="checkbox"/> Flexible Shaft | <input type="checkbox"/> Rope |
| <input type="checkbox"/> Bobby Pin | <input type="checkbox"/> Florist | <input type="checkbox"/> Safety Pin |
| <input type="checkbox"/> Bobbin Ring | <input type="checkbox"/> Fuse | <input type="checkbox"/> Shaft |
| <input type="checkbox"/> Bookbinder | <input type="checkbox"/> Glass Netting | <input type="checkbox"/> Spiral Binding |
| <input type="checkbox"/> Bottle Cap | <input type="checkbox"/> Hair Pin | <input type="checkbox"/> Spark Coil Core |
| <input type="checkbox"/> Broom | <input type="checkbox"/> Holly | <input type="checkbox"/> Stapling |
| <input type="checkbox"/> Brush | <input type="checkbox"/> Hook & Eye | <input type="checkbox"/> Stitching |
| <input type="checkbox"/> Cable | <input type="checkbox"/> Lock Spring | <input type="checkbox"/> Stove Pipe |
| <input type="checkbox"/> Car Seal | <input type="checkbox"/> Piano Covering | <input type="checkbox"/> Strand |
| <input type="checkbox"/> Core | <input type="checkbox"/> Picture Cord | <input type="checkbox"/> Tag |
| <input type="checkbox"/> Cotter Pin | <input type="checkbox"/> Pin | <input type="checkbox"/> Umbrella |
| <input type="checkbox"/> Covering | <input type="checkbox"/> Piston Ring | <input type="checkbox"/> Weaving |



Whatever your needs in wire... whether it's fine wire for weaving or heavier types for springs, etc. . . . specify SENECA for top quality and uniformity! High carbon or low carbon steel wire... aluminum... bronze. Sizes No. 40 W & M gauge (.007) and larger. Many shapes—round, half round, oval, square, flat, straightened and cut. Choice of finishes—bright, soft annealed, coppered, liquor finish, tinned, bright galvanized, oil tempered, enameled.

Consult with Seneca for all needs in High Quality Wire.

Seneca

WIRE & MFG. COMPANY • FOSTORIA, OHIO

Representatives in practically All Principal Cities

the A-B-C

of M-S-T



Michigan Electric Resistance WELDED STEEL TUBING

ROUND

$\frac{3}{8}$ " to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

$\frac{1}{2}$ " to 2" 20 gauge, 1" to 2 $\frac{3}{4}$ ",
14, 16, 18 gauge

Carbon 1010 to 1025

Michigan Tubing

has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Steering Jacket

Ready for the automobile assembly line is this vital volume produced tubular part of a major control unit.

Lower tube end is reduced to 2.260" O. D. x 10.525" long, held to close tolerance for assembly in line with body of base tube without machining. Upper end is reduced to 2.125" O. D. x 2.562" long, held on center line to extremely close decimal dimensions, with two perforations at tapered section. Michigan workmanship can always be depended upon to assure the exacting tolerances and part uniformity to keep customer assembly operations moving smoothly.

Michigan engineers will be pleased to work with you on an adaptation of welded steel tubing to help you make your product better at lower cost.



Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

RESISTANCE WELDED STEEL TUBING

Michigan STEEL TUBE PRODUCTS CO.

THE OLDEST NAME IN ELECTRIC

More than 35 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN—SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland Co., Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—Hugh Davis, Jr., Sewickley, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—Harry E. Clark & Co., Houston, Texas—J. B. Beaird Co., Inc., Shreveport, La.

Technical Program

Continued

Alternate: Semi-Empirical Equation for the Spectral Energy Distribution in X-Ray Beams—Charles R. Emigh, Los Alamos.

Tuesday, Oct. 21, p.m.

ECONOMICS OF NONDESTRUCTIVE TESTING

Economic Factors in Nondestructive Testing—W. E. Thomas, Vice-President, Magnaflux Corp.

Quality Control Application of Non-destructive Tests in the Airframe Industries Which Will Effectively Lower Production Costs—B. W. Clawson, Quality Manager, Douglas Aircraft, Inc.

The Use of Nondestructive Test Methods in Heavy Manufacture—James A. Pratt, Metallurgical Engineer, Westinghouse Electric Corp.

Wednesday, Oct. 22, a.m.

NEW ULTRASONIC TESTS

An Evaluation of New Immersion Ultrasonic Testing Techniques—Leslie W. Ball, U. S. Naval Ordnance Test Station.

Ultrasonic Examinations of Weldments and the Establishment of Safe Acceptable Limits for Defects—Frank C. Parker, Carbide & Carbon Chemicals Co.

Ultrasonic Equipment for High-Precision Thickness Measurements—Peter K. Bloch, Vice-President, Branson Instrument Co.

Geophysics—Its Relation to Nondestructive Testing—Peter Dehlinger and Sam Wenk, Battelle Memorial Institute.

Alternate: Economic Industrial Applications of the Metroscope—Mr. Mann, Walter Kidde & Co.

Alternate: Future Trends in Industrial Ultrasonic Testing—William I. Bendz, Sperry Products, Inc.

—Technical Program—

Continued

Wednesday, Oct. 22, p.m.

NEW ELECTROMAGNETIC TESTS

Industrial Evaluation of Search Coil Flaw Detection Techniques—Carleton E. Hastings, Watertown Arsenal.

A Metal Comparator for the Inspection and Classification of Metals—B. M. Smith, General Engineering Laboratory, General Electric Co.

The Application of Foerster-Type Instruments in American Industry Representative of Magnaflux Corp.

Alternate: New Nondestructive Test Instruments—Friedrich Foerster, Institut-fur-Dr. Foerster, Germany.

Thursday, Oct. 23, a.m.

LIQUID-PENETRANT AND ELECTRICAL METHODS

Comparison of Materials for Liquid Penetrant Inspection—Hamilton Migel and Taber de Forest, Magnaflux Corp.

Lowering Production Costs With Dy-Chek and Chek-Spek Dye Penetrants—Representative of Turco Products, Inc.

The Application of Wire-Resistance Strain Gages to Lower Production Costs—Francis G. Tatnall, Baldwin-Lima-Hamilton Corp.

Alternate: The Measurement of Ionization in Dielectric Structures—a New Nondestructive Test for Electrical Insulating Materials—D. A. Lupfer, General Electric Co.

Thursday, Oct. 23, p.m.

MEHL HONOR LECTURE

Society for Nondestructive Testing Annual Lecture Honoring Dr. Robert F. Mehl—Donald T. O'Connor, Chief, Radiology Section, Naval Ordnance Laboratory.

Turn Page

A-1033

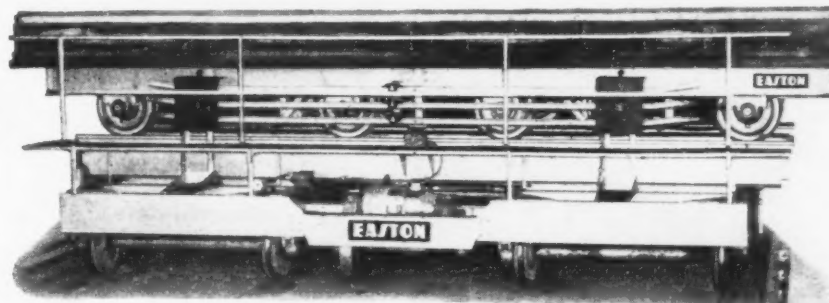


EASTON

EASTON experience covers small and large capacity furnace cars for every requirement.

Furnace Cars

Electric furnace car mounted on electric transfer car for completely automatic continuous heat treating system.



EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH

**Standard
..Specials**

STEEL WASHERS FOR EVERY NEED

A DEPENDABLE SUPPLIER
FOR 38 YEARS . . .

Your requirements for standard and special steel washers are sure to be satisfied at Joliet. A bank containing thousands of special dies in many shapes and forms, 9/32" to 8" O.D., gauges No. 28 to 3/8", stands ready to answer your needs. A VARIETY OF FINISHES IS AVAILABLE to meet your special needs, including: Electro-plating, Galvanizing, Parkerizing, and Cyanide hardening.

After All!

THERE'S NO SUBSTITUTE
FOR QUALITY AND SERVICE

201 CONNELL AVE.
JOLIET, ILLINOIS

**JOLIET
WROUGHT
WASHER CO.**

STEEL: Workhorse Today and Tomorrow

Basic oxide reduction will stand, but new methods are gaining recognition . . . Low shaft furnace, greater use of oxygen enriched blast will yield superior steels tomorrow.

The world is producing iron at the rate of more than 200 million tons per year, for the most part as steel, and a small part as pig iron (about 20 million tons). Almost nine-tenths of the total pig iron produced, 150 million tons, is only an intermediate product, since it is converted into steel.

More than half the steel produced is obtained from pig iron, less than half from scrap. This ratio is slowly shifting in favor of scrap. Since some scrap is also used in pig iron production, nearly half of the iron production, taken in its entirety, is derived from scrap and the other half from iron

ore. Annual requirements of iron ore amount to some 250 million tons, which take over 100 million tons of coke to smelt.

With the realization of these stupendous figures, iron production is proving more and more to be a problem of raw materials, just as indeed our whole life becomes more than ever dependent on materials found in the earth's crust.

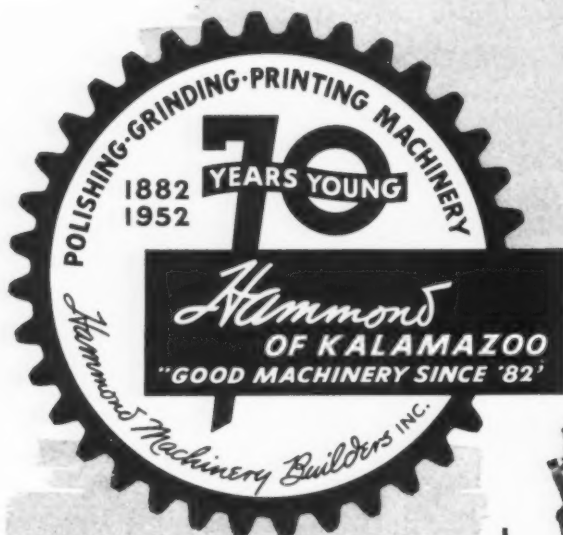
Resources abundant only a few decades ago are nearing exhaustion. In the very near future the consumption of materials at the present rate will lead to a shifting of industries and to radical changes in our production methods. So far as concerns iron, this transformation has already begun on very modest lines; it will assume substantial shape before long.

In the broadest sense, man's task is to make the most rational use of the available raw materials, and to do so with an eye not only to the present but to the future. Unsystematic exploitation of resources is a crime against posterity. The problem for steelmakers is to transform present production methods to make the best possible use of available raw materials at our disposal.

Other Fuels—Fuel required for heating and reducing the charge in iron production need no longer be only coke, as it is today. The aim must be to be able to use any fuel, particularly as the over-all fuel reserves are also not inexhaustible, although much larger than those of coking coal.

With regard to ferrous raw materials iron production methods must be adapted to the characteristics of the raw materials. Since about 1/20 of the earth's crust consists of iron, supplies of our most important metal are practically unlimited. However, the lower the Fe content of the ores to be smelted, the greater are the impurities they contain, making the production process more and more difficult.

Investment Factor—Owing to



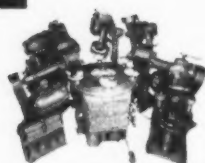
There is no substitute
for EXPERIENCE

With the new and better constantly coming into the picture and the old going out, these 70 years have not been long.

Even so, they have piled up a big bank of experience to which we add and draw from each day.

We are grateful for the confidence of tens of thousands of HAMMOND users. For them and for all, through ever broadening research, engineering, and production, we propose to insure another 70 active and eventful years.

See us at Booth 1130
National Metal Exposition



Model K-46-6 Super 5 Head Rotary Automatic. (One of a line of Rotary, Strait-Line, and Jr. Automatics).

WRITE FOR CATALOG A-50



Model VRO "DIAL CONTROLLED" Variable Speed Polishing Lathe with Model 3-A (air-tensioned) Backstands.

WRITE FOR CATALOG A-60



Model 14-WD Wet or Dry Carbide Tool Grinder with 2-14" dia. cup wheels. Model 14-SWD available with a straight and a cup wheel.

WRITE FOR CATALOG B-225

Hammond Machinery Builders
INC.
1612 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

technical progress over the last 20 to 30 yr we can now adapt our iron production methods to available raw materials. The change-over will take place gradually, if only because of the heavy capital investments in existing works.

There is no likelihood of any change, in the immediate future, in the principal method of iron production—reduction of the iron oxides. Thermal dissociation is out of the question, and electrolysis cannot be considered for mass-production purposes.

Fuel Supplements—The principal means of reduction will remain carbon in some form of fuel, although it may be supplemented to some extent by hydrogen here and there, especially in areas poor in coal and rich in natural gas.

Almost all ore delivered for smelting at the present time is first reduced to pig iron, which is converted into steel by further refining. In contrast to this "indirect" process, efforts have been made for a long time to find a "direct" process, as existed in the days of the catalan furnace.

Direct—These efforts are frequently made in the mistaken belief that production via pig iron is a roundabout method. But even direct methods yield only an intermediate product which must undergo a further process before becoming usable. This difference in the intermediate product is not the deciding factor; the vital point is which process is ultimately the cheaper.

In mass production, the answer is the indirect and less costly method from the economic point of view. This fact does not preclude the possibility that a really direct steel production process may yet be discovered that is also economically more direct. But dis-

Prof. Robert Durrer of Zurich Polytechnicum and Director of the Louis de Roll Iron and Steel Works prepared the accompanying report on recent trends in the steel industry for the Economic Commission for Europe.



In the reconstruction job on the famous old Brooklyn Bridge, **KRANE KARs** have been working on the demolition and rebuilding of the suspended spans and approaches. They have assisted in the removal of the entire wood block flooring, tracks, ties, etc., and have unloaded and erected approximately 4000 tons of structural steel and bridge grating. Now they are unloading mats, steel reinforcing bars, and structural steel . . . Lifting, Transporting, and Positioning this steel for the supports and new deck. Says Arthur J. Klevens of the Klevens Corp., General Contractors, "We're glad we have these **KRANE KARs**. They're doing a fine job."

1½, 2½, 5, and 10 ton capacities; gas or diesel, pneumatic or solid rubber tires, 9 to 37 ft. booms or adjustable telescopic booms; all-weather cabs, magnets, buckets, other accessories available. Thousands serving industrial plants throughout the world. Write for Bulletin No. 89 entitled, **HOW TO CUT MATERIALS HANDLING COSTS**.

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.



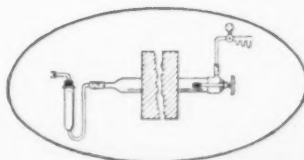
The Original Swing-Boom Mobile Crane with Front-Wheel Drive and Rear-Wheel Steer

LAY YOUR HAND

On a
MCDANEL
Combustion
Tube



*It's VERY FEEL
MATCHES ITS PEERLESS
PERFORMANCE*



MCDANEL
PORCELAIN SPECIALTIES

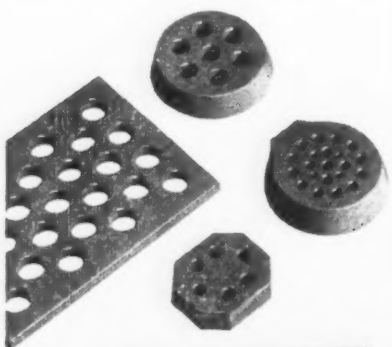
We hand to you a tube of complete satisfaction and specialties to suit your needs.

McDaniel Refractory Porcelain Co.
Beaver Falls . . . Penna.

HOW MUCH ARE STRAINER CORES

Really? COSTING YOU?

Oil-sand strainer core costs include oil, sand, binder, labor and overhead. But don't stop there—those cores are costing you plenty in reject losses, faulty castings, and slow production! AlSiMag Ceramic Strainer Cores save a lot of money right down the line—fewer rejects, better castings, and faster production. It's smart business to use AlSiMag Strainer Cores.



- Strong, will not break in handling
- Non-spalling
- Easy and fast to handle
- Not affected by moisture
- Flat and uniform
- Completely free of gas
- Resist heat shock
- No harmful erosion at normal pouring temperatures
- Do not contaminate scrap

TEST THEM YOURSELF—FREE! Ask us for free samples of sizes in stock; test them in your toughest conditions, highest temperatures. See for yourself how AlSiMag cores can save you money.

OUR NEW MODERN PLANT AND HIGH SPEED PRODUCTION FACILITIES PERMIT NEW LOWER PRICES AND DELIVERY IN ANY QUANTITY

AMERICAN LAVA CORPORATION

51 YEARS OF CERAMIC LEADERSHIP
CHATTANOOGA 5, TENNESSEE

—Steelmaking trends—

Continued

Steel of tomorrow promises to be superior product . . . Big defect in blast furnace is loss of the heat.

recovery of such a method is rather unlikely.

Superior Product—Almost all ore is smelted today in blast furnaces. Almost all the liquid pig iron thus produced is converted into molten steel. So far as can be judged, this method of production will continue.

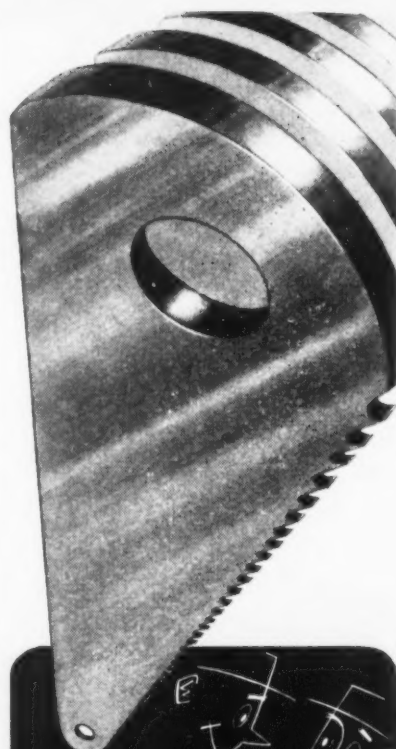
In the future, however, the intermediate product, so long as it is not used in foundries, will be far superior in composition to the pig iron of today. Accordingly, the subsequent refining process will have to be more flexible. Both processes, smelting and refining, will nevertheless be radically altered.

Defect—Fundamental defect in blast furnace smelting is the use of atmospheric air, since it leads to the production of vast quantities of gas, which draw off equally vast amounts of heat from the hearth in the direction of the top of the furnace.

In order that this heat can be substantially transferred from the rising gas to the descending charge, very high furnaces are required, up to almost 30 m high. Moreover, this height is required to make indirect reduction, reduction with oxide of carbon, as thorough as possible and thereby to lower coke consumption.

How Much Gas?—The less the specific quantity of gas, the less high need the furnace be, as electric smelting has shown in practice. Experience with the electric blast furnace, modeled on the coke blast furnace, that reduction takes place only at the bottom of the shaft led to introduction of the electric low-shaft furnace, which consists of no more than a hearth.

Although, other things being equal, a lower furnace is also cheaper, its greatest advantage is that it widens the limits of the raw



for fast
economical
metal cutting
STAR "Moly"
high speed
Power Blades



For over 70 years, industry has preferred STAR quality, preferred the blades made of carefully heat-treated, top-quality steel, fabricated on specially designed equipment—all for the sole purpose of delivering fast, economical metal cutting and long blade life.

FOR FAST, ECONOMICAL Service

STAR Blades are sold only through recognized distributors. You get *fast* service from local distributors' inventories. You get *economical* service because your distributor knows your operations best, he is easy to reach, he is trained by qualified factory representatives to know the answers to your metal cutting—and hundreds of other—problems.



CLEMSON BROS., Inc.
MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hack
Saw Blades, Frames, Metal Cutting Band
Saw Blades and Clemson Lawn Machines

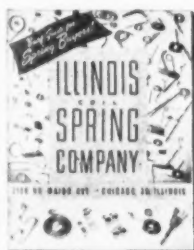
Why be Upset



about SPRINGS?

Illinois Coil Spring Company, Chicago, makes them right—and at reasonable cost. Regarded by an ever increasing number of manufacturers as the ideal source for high grade mechanical springs, all types and sizes—also clips, small stampings and wire forms. We'll design them for you or make them exactly to your specifications. Plant is large enough to handle big orders smoothly, compact enough to give prompt service on small orders and experimental work. Our steady growth is evidence

that policy, price and production are RIGHT. So why not call us in on that spring job?



Sent On Request!

Interesting new bulletin "BRIEF GUIDE for SPRING BUYERS," tells in plain language what a good spring is and how to get it without excessive cost. (1A)

MR. _____
FIRM _____
STREET _____
CITY _____

(Mail to 2100 N. Major Ave., Chicago 39, Ill.)

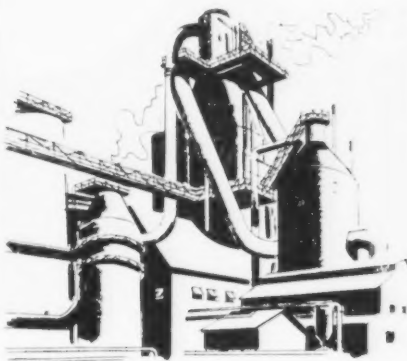
—Steelmaking trends—

Continued

Must convert from high charge to low charge furnace . . . Would permit better use of raw materials.

materials that can be used. At one end of the scale is the blast furnace with its high shaft, i.e. the furnace with a very high charge (high-charge furnace), at the other, the low-charge furnace.

Low Charge Process—If we are to make fullest possible use of available raw materials we must go over from the high-charge to the low-charge process. The electric low-shaft furnace is a practical example of a low-charge furnace. But there are limits to its



uses because it operates on hydroelectric power, so that it can only replace the blast furnace to a minor extent.

The specific quantity of gas can be reduced although to a lesser extent than by the suppression of the blast (as in electric smelting) by the complete or partial elimination of nitrogen, and the shaft can be shortened at the same time. In this direction may lie the best prospects of development for the smelting of ferrous minerals with the help of any kind of solid fuel.

Blast furnaces are quite unsuitable for the reduction of ores with oxygen. Enrichment of the blast with oxygen has a favorable influence on production and coke consumption only as long as the temperature of the furnace gas remains well above 100°C. These advantages themselves are relatively small.

Foote

MINERAL COMPANY

Now Makes Available

PURE METALS for research and development

PURE TITANIUM CRYSTAL BAR

Iodide processed, Foote pure Titanium (99.9% min.) is an important control product for research engineers.

PURE DUCTILE ZIRCONIUM

High corrosion resistance to both acids and alkalis, lightness (20% lighter than steel), low neutron absorption and affinity for gases are among the unique qualities of Zirconium . . . one of the metals with a bright future in this atomic age.

PURE HAFNIUM

This little publicized "impurity" of Zirconium, a Foote production first, offers unusual properties for high quality steel, electronics equipment, etc.

PURE TUNGSTEN METAL POWDER

Carbon reduced grades of pure Tungsten have proven uses in carbide cutting tools, and production of metals for surface hardening, etc.

PURE SILICON

Highest purity available for commercial and research use, with impurities comprising only three to four parts per million.

All of these pure metals are available in research quantities. Project your product development plans with Pure Metals from Foote. Write for further information.

FOOTE

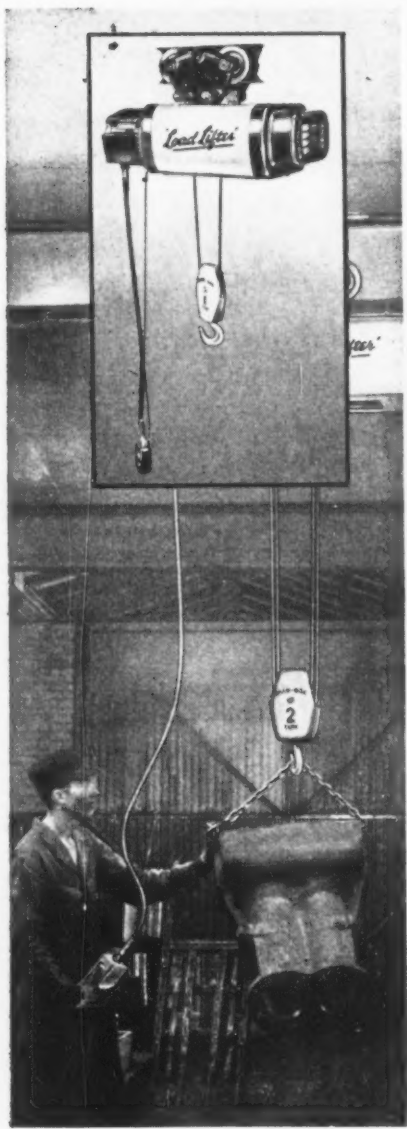
LEADERSHIP in Lithium.

FIRST in research and development of the "lesser known elements."

Foote

MINERAL COMPANY

438 Eighteen W. Chelton Bldg.
Philadelphia 44, Pa.



FAST LIFTING SPEEDS OUTPUT !

The fast lifting action of the "Series 700" 'Load Lifter' Electric Hoist shortens handling time. Manpower can process more units per day for less.

Keep your production at high levels around the clock. Put this heavy-duty 'Load Lifter' on the job. Push-button control with only 24 volts at the push button, wipes out muscle strain, increases safety, and maintains worker efficiency. Simple design and rugged construction assure long life in the severest service. Capacities: 1,000 pounds upwards. Single and two-speed control available. Bulletin No. 399 contains all the facts. Write for a copy.



'Load Lifter'

HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial Instruments.

—Steelmaking trends—

Continued

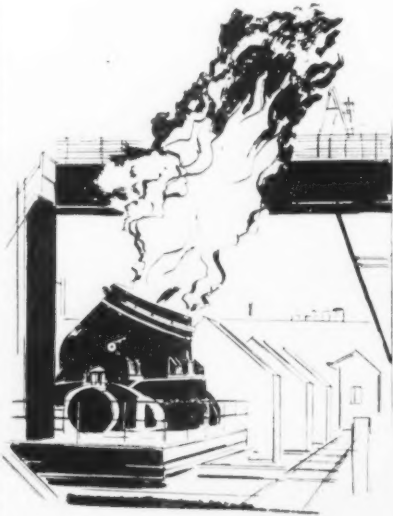
Chief advantage of oxygen achieved only in low-shaft furnace . . . Present furnaces have long life.

Add Oxygen—Chief advantage of reduction with oxygen cannot be achieved in blast furnaces, but only in low-shaft furnaces. This need not prevent the small advantages to be gained by the use of oxygen in existing blast furnaces which, it may be added, are similar to those achieved by increasing the pressure of the blast. Fundamental defects of blast furnaces can be mitigated, not removed.

Existing blast furnaces will be used for many years to come as the foremost smelting apparatus. The process for reduction with oxygen in low-shaft furnaces, proved in principle, should be worked out without delay, so it may be adopted as rapidly as possible.

Advantages—Metallurgical advantages of the oxygen low-shaft furnace apply not only to the production of iron, but also to other metals and alloys, particularly those with a high point of fusion. The ferroalloys which cannot be produced in blast furnaces should only be produced in the oxygen low-shaft furnaces, as soon as the process has been developed in practice and when the coal is cheaper than electricity per calorie.

The charge is even lower than



For FAST SERVICE

**on
LARGE
INDUSTRIAL
GEARS**

**Call
SIMONDS
First!**

Convenient, central location and nearly 60 years of specialized experience make SIMONDS your logical source for large industrial gears. SIMONDS GEAR is able to assure you fast, accurate service on all types and sizes—Spur Gears up to 145", Bevel Gears up to 60", Worm Gears up to 72" . . . also worms, racks and pinions. Materials include cast or forged steel, gray iron, bronze, Meehanite, rawhide and bakelite. Whether your next heavy gear need is "rush" or "regular" . . . call SIMONDS first.

Stock carrying distributors for Ramsey Silent Chain Drives and Couplings, industrial V-Belts.



**THE
SIMONDS
GEAR & MFG. CO.**

LIBERTY at 25TH PITTSBURGH 22, PA.

—Steelmaking trends—

Continued

Low charge also used for smelting in rotary furnace . . . "Direct" processes show best results so far.

in the low-shaft furnace when it is spread in thin layers in the bath. Reaction conditions are ideal. Fine ore is reduced by an admixture of fuel or by the carbon in the bath or both. Heating takes place via the bath, e.g. by oxygen blast, the burnt carbon being replaced by charging more fuel. The idea is old, but it has never yet been put into practice. If the difficulties in the way, practical rather than fundamental, could be overcome, iron ores and coal fines could be used direct in iron production.

Smelting—An equally low charge is used for smelting in the rotary furnace where the material to be reduced is heated from the outside, while reduction takes place inside, as in the shaft furnace. The heating from outside is much less effective since it is slower and entails much loss as well as being very severe on the refractory-brick lining.

Heating is most efficient where heat is produced within the material to be heated, as in the case of the shaft furnace. Smelting in the rotary furnace is already being practiced in various forms. It has the advantage that it enables fine ores to be used. Possibilities of application, at present still limited, depend upon local conditions.

Excellent Results—Direct processes for steel production have already yielded excellent results, given suitable local conditions, if not for mass production, at any rate for the production of special kinds of iron. This is particularly true of the processes developed and employed in Sweden for the production of sponge iron.

In Sweden, with its magnificent resources in raw materials for iron production, the shortage of charcoal, best fuel and reducing agent, is becoming more and more acute. Its price has reached an exceptionally high level. It is

Turn Page

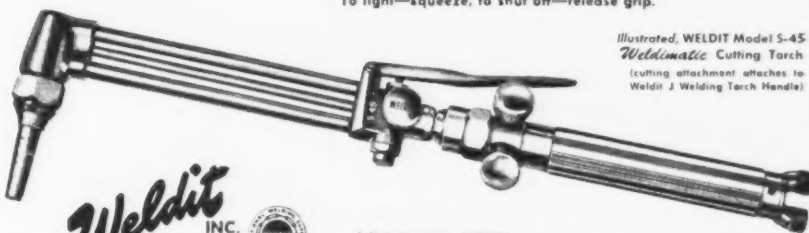
Weldimatic means Fully Automatic



**First
Aid!**

The long service life of Weldit Torches can, to a degree, be attributed to Weldit's service facilities. The Weldit service department is an integral unit of Weldit factory operation . . . skilled mechanics and modern machinery expedite repairs and replacements of genuine Weldit parts at low cost, giving even greater service life to Weldit torches.

Weldimatic natural action!
To light—squeeze, to shut off—release grip.



Illustrated, WELDIT Model 5-45
Weldimatic Cutting Torch
(cutting attachment attaches to
Weldit J Welding Torch Handle)

Weldit
INC.
SINCE 1918

A limited number of Weldit
Dealer franchises available.

992 OAKMAN BOULEVARD, DETROIT 6, MICHIGAN

CANADIAN DISTRIBUTORS—ALLOY METAL SALES—181 Fleet St., Toronto 5, Ontario, Canada

YOU CAN PROFIT . . .

From the newest developments in metalworking equipment featured
EACH WEEK in the **ADVERTISING PAGES** of the

IRON AGE

Watch them every issue! And for further particulars, write:

The **Iron Age**

100 E. 42ND STREET
NEW YORK 17, N. Y.

A CHILTON PUBLICATION

HAMILTON

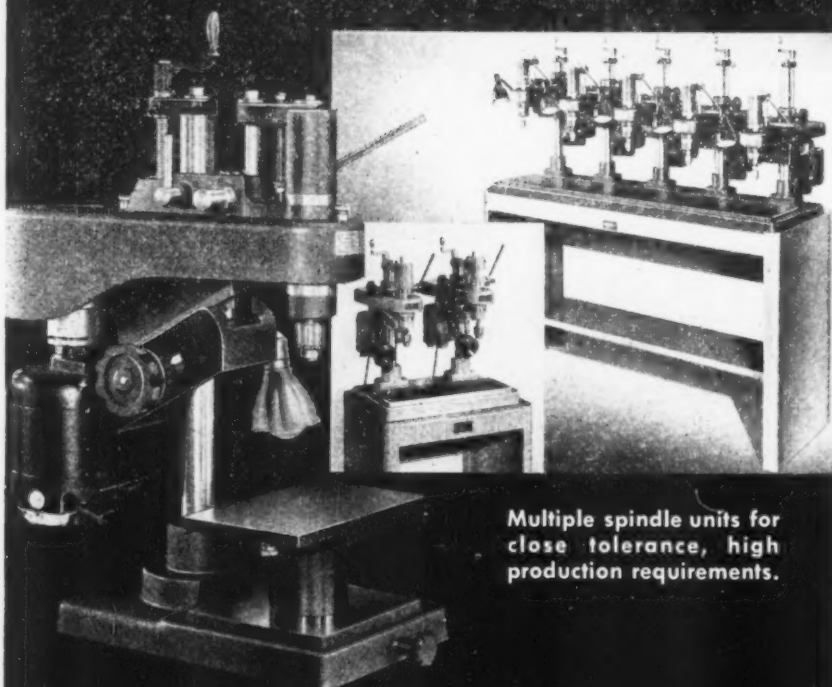
Small Hole

DRILLING MACHINES

for the precision industries

Super-Sensitive ● Super-Accurate
Speedy

WRITE FOR BULLETIN 5226



Multiple spindle units for close tolerance, high production requirements.

THE *Hamilton* TOOL COMPANY
856 SO. NINTH STREET • HAMILTON • OHIO • U • S • A

How To Reach Them

The thousands of purchasing executives, production chiefs, and engineers, all potential BUYERS of your products are among the readers of *Iron Age*. Your advertisement here can pave the way for your salesmen throughout the metalworking industry.

For information write:

The Iron Age 100 E. 42nd St., NEW YORK 17, N. Y.

Steelmaking trends

Continued

Sponge iron a high grade scrap
... Has no special virtue beyond its purity ... Refining of scrap.

therefore becoming increasingly expensive to produce the world-famous Swedish charcoal pig iron

Sponge Iron—Sponge iron can be used as a metallurgical substitute for charcoal pig iron in steel production, and if it can be produced cheaply enough its use is economically justified. It is a steel-like intermediate metal of extraordinary purity, when produced from pure or purified raw materials.

Sponge iron is therefore, first and foremost, a high-grade scrap which can be substituted for unreliable commercial scrap in steel-making, when certain metallurgical qualities are required or when economically feasible. It is now being more widely used wherever its use can lower production costs.

There are already two plants in Sweden, one of which has been in operation for more than 10 yr. Others are under construction or planned. Such methods are also of special value in countries, like Venezuela, with rich ore and natural gas deposits.

No Special Virtue—The once commonly held view that steel produced from sponge iron is better, because of its purity, than that produced from scrap, is tenable if the scrap contains considerable impurities; but there is no ground for regarding sponge iron as superior merely because it is "virgin iron."

The mass production of steel is based on pig iron and scrap, i.e., on the one hand, by refining and removing most of the impurities from the pig iron and, on the other, by regenerating the scrap, which is already steel although not in usable form.

The refining mainly consists of burning out the impurities; the regeneration, in remelting the steel already there. The quickest and cheapest way of refining pig



When you have a READING CRANE installed in your plant, you get a crane CUSTOM-BUILT to meet your specific materials handling operation—at no added engineering cost!

Known as UNIT DESIGN, this unique method of crane construction reduces your costs in 2 ways.

- 1 LOWERS FIRST COST**—Because READING CRANES offer you a choice of several interchangeable motor, control and hoisting units, you buy no "extras" to solve special handling problems.
- 2 REDUCES MAINTENANCE COSTS**—All of the operating parts in a READING CRANE are easily accessible for overhaul or repair. The UNIT DESIGN feature makes it possible to remove any one unit without expensive "breaking down" of other units.

See your distributor for information on how you can get a READING CRANE "tailor made" to your own specifications. Drop us a line for your free copy of "The Why and How of Faster Production."

READING CRANE & HOIST CORPORATION
2101 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

**READING
CRANES**

Steelmaking trends

Continued

Openhearth maintains place . . .
Product usually superior to steels from other steelmaking methods.

iron is at present the air-blast method, i.e. oxidation with atmospheric oxygen.

Openhearth—A large proportion of the pig iron is nevertheless converted into steel by combining with oxygen in the openhearth furnace, which is a slow and expensive process. This essentially complicated method must be em-



ployed, since the hearth furnace is the scrap smelter par excellence and openhearth steel is in many respects superior to converter steel.

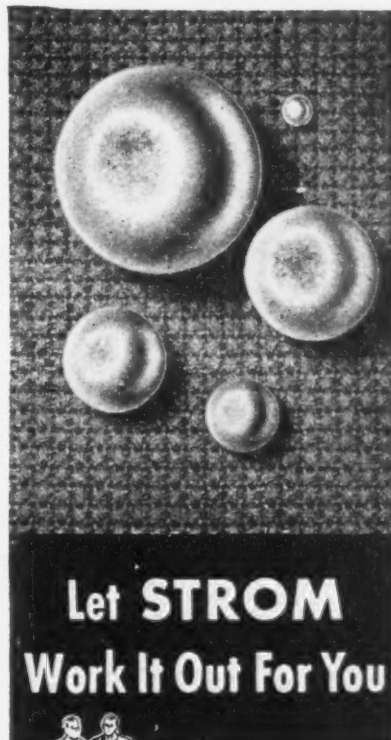
Cause of the inferiority of the converter process can be traced to the air blast. Under the present method, the nitrogen in the blast absorbs so much heat from the bath that the quantity of cold metal scrap that can be added is relatively negligible. So much nitrogen enters the steel that the latter contains more nitrogen.

Low in Nitrogen—By employing a blast rich in oxygen and a sufficiently low content of nitrogen, the heat normally absorbed by the nitrogen remains in the steel. The steel then has a lower nitrogen content than openhearth steel.

This process has already been proved in small converters, both

Turn Page

a metal ball PROBLEM?



Whether it is a precision ball bearing or one of the other many ball applications in industry, your problem will not be entirely new. Strom has been in on many ball problems and knows the importance of the right ball for the job.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

Strom
STEEL BALL CO.

1850 So. 54th Ave., Cicero 50, Ill.

Largest Independent and Exclusive
Metal Ball Manufacturer

**QUANTITY
PRODUCTION
OF
GREY IRON
CASTINGS**

**ONE OF THE
NATION'S LARGEST
AND MOST MODERN
PRODUCTION
FOUNDRIES**

ESTABLISHED 1866
**THE WHELAND
COMPANY**
CHATTANOOGA 2, TENN.

Steel Makers Since 1871

**STRIP
STEEL**

STANLEY

Reg. U.S. Pat. Off.

Hot Rolled—
Cold Rolled
Special Carbon—
Alloys

The STANLEY WORKS
New Britain, Bridgeport, Conn.
Hamilton, Ont.

The Iron Age

DIRECTORY OF TOOL STEELS

Over 2000 domestic and foreign tool and die steels listed by brand and type with data on composition, application, availability and producer's name and address.

SEND \$2.00 TO

Reader Service Dept., THE IRON AGE, 100 E. 42 St., N. Y. 17, N. Y.

—Steelmaking trends—

Continued

Oxygen use not aimed at speeding up refining of steel bath . . . Big use is to aid in melting of scrap.

acid and basic. Tests have been made in an acid converter of 15 tons but there are still difficulties, although not of a fundamental character, in applying the process in a large basic converter. When these are overcome, most of the scrap now remelted in the open-hearth furnace can be regenerated in the oxygen converter with the heat now lost due to the nitrogen in the air blast.



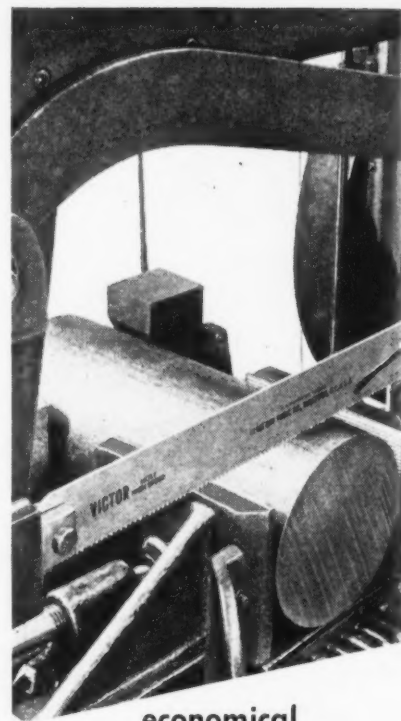
In the basic electric-steel furnaces where relatively small quantities of pig iron (about one-quarter compared to scrap) are used, the blowing of oxygen is already in regular operation.

Use of oxygen is aimed not at speeding up the refining of a bath of steel, as is done in openhearth and electric furnaces in many places, but to use the heat produced by the blowing of oxygen to melt the scrap and thereby correspondingly reduce electric consumption.

Scrap Reduction—Use of oxygen as indicated is a practical possibility and lays the basis for consideration of the use of the heat produced by the blowing of oxygen for melting scrap in the production of steel. When proved completely successful, all that is required for production of molten steel is a converter.

Where electric power is cheap and there is more scrap than pig

Turn to Page 392



**economical
metal cutting
with**

**VICTOR "Moly"
HIGH SPEED
POWER BLADES**

Whatever your metal cutting problem, VICTOR "Moly"® High Speed Power Blades will cut your initial blade cost 15%, and give you the additional economy of more efficient cutting.

Quality makes VICTOR Blades industry's preference—top-quality, carefully heat-treated steel, fabricated on specially designed equipment, to give you fast, economical cutting and long blade life. Send for the free VICTOR Metal Cutting Booklet which tells you how to pi 'em—Gold "Moly"® High Speed or Silver Unbreakable High Speed.

**ECONOMICAL SERVICE
from your
VICTOR DISTRIBUTOR**

VICTOR "Moly"® High Speed Power Blades are always sold through the recognized Industrial Distributor because he is closest to your problems. You know and have confidence in him, and he can give you delivery from stock where and when you want it.

 **VICTOR**
SAW WORKS, INC. • MIDDLETOWN, N. Y., U.S.A.
Makers of Hand and Power Hack Saw Blades
Frames and Metal Cutting Band Saw Blades

IN VAPOR DEGREASING

WHEN SO MUCH

DEPENDS ON A QUALITY SOLVENT



IT PAYS TO SPECIFY

SPEEDY, DEPENDABLE...



"TRICLENE" D Trichlorethylene is the result of over 20 years of research and practical experience in the degreasing field. Made under carefully controlled conditions by the pioneer manufacturer of degreasing solvents in the U. S., each shipment of "Triclene" D is carefully pretested for stability and purity... must meet test standards higher than those established by military and federal specifications (MIL-7003 and O-T-634). Yet "Triclene" D costs no more than other leading brands of degreasing solvents.

"Triclene" D is available nationally in 55 gallon drums and tank cars of various sizes. Distribution points in over 100 principal cities are ready to serve you with prompt deliveries. And trained Du Pont technical representatives with broad experience in the field will be happy to work closely with you in keeping your degreasing installations operating at peak efficiency.

E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

Send for your copy of "Vapor Degreasing with Du Pont Non-Flammable Solvents." It shows you how and where "Triclene" D can be used to save time and cut costs in metal cleaning.



150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used . . . and more facts on Du Pont "Triclene" D. We are interested in cleaning _____ products.

Name _____ Position _____

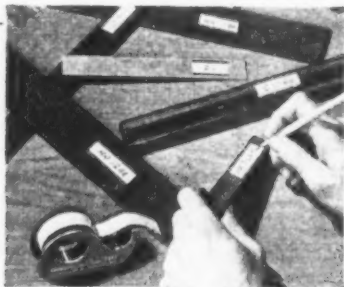
Firm _____

Street & No. _____

City _____ State _____

NEW LABELING TAPE

Write on it — Won't Smudge
resists dirt, oil, water, acids



For Shop, Factory, Laboratory

Nothing else like LABELON—the amazing "Write on it" plastic tape! Use it to label stockroom shelves, bins, tools, hard-to-mark parts; for indicating rejects and service department repairs; for marking laboratory equipment, supplies, experiments; for panel boards or wiring; for office files, folders, etc.

LABELON TAPE sticks without moistening to any smooth, clean surface—yet can be quickly removed. Resists heat up to 160°. Just write on it with pencil or stylus—message won't smudge. Choice of widths and colors. Handy dispenser with cutter bar.

See your nearest dealer,
or write for sample and prices.

LABELON TAPE CO., INC.

Dept. 1A, 450 Atlantic Ave., Rochester 9, N. Y.

Derusto

PREVENTS RUST

Stops RUST

FOR NEW
OR RUSTED METAL

EXTERIOR-INTERIOR

AVAILABLE IN
STANDARD COLORS

For Pittsburgh Testing Laboratory
Report and your nearest Distributor
Write Dept 1

MANUFACTURED BY
MASTER BRONZE POWDER COMPANY
3009 CALUMET AVE. HAMMOND, INDIANA

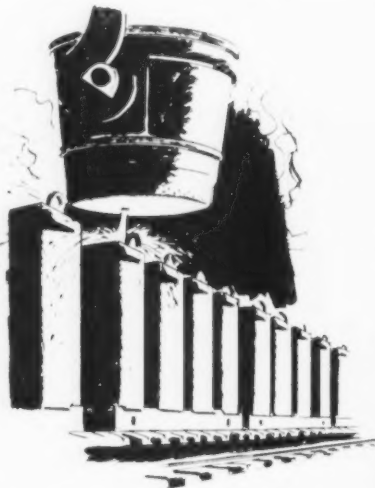
Steelmaking trends

Continued

Essential to keep metal losses during treatment at a minimum . . .
Pelletization will have great value.

iron available, the electric steel furnace can function as a combined converter and electric furnace, consuming a small amount of electrical energy.

Transformation of iron production on the lines indicated will yield an intermediate metal of vastly different composition. It



will also have a marked effect on preliminary preparation of the materials. Main objective today is to adapt raw materials to the metallurgical processes.

Metal Losses—It is wiser to suit the methods of treatment to the raw materials. First essential is to keep metal losses during treatment to a minimum and, as far as possible, make treatment a part of the metallurgical process. The pelletization method now being developed may be of considerable value.

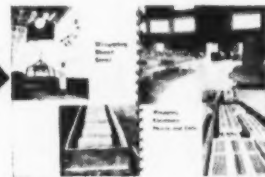
For these reasons, and owing to



USE TOUGH, WATERPROOF

FIBREEN

TO PROTECT SHEETS AND
FABRICATED METAL PRODUCTS

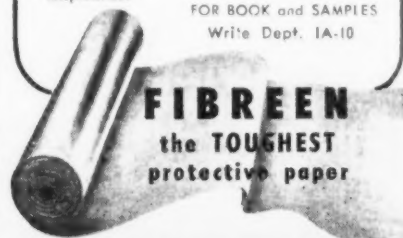


Send for this book on packaging

FIBREEN is the toughest of protective packaging papers . . . it provides complete protection from damage by moisture, grit, dust and rough handling in transit or storage. Economical . . . pliable and easy to handle . . . dependable.

Roll widths: 36" to 96" . . . immediate shipments.

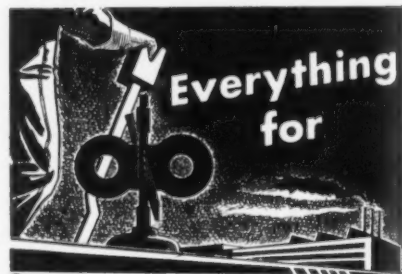
FOR BOOK and SAMPLES
Write Dept. 1A-10



FIBREEN
the TOUGHEST
protective paper

THE SISALKRAFT CO.

Chicago 6 • New York 17 • San Francisco 5



INDUSTRIAL TRACK



Need Rails—Switches—
Frogs—Guard Rails—
Track Tools? For best selections, prompt deliveries—try FOSTER—shipments from stock in 5 nationwide warehouses.

Call on FOSTER for everything in Industrial Track Equipment and supplies.

RAILS New and Relaying

Send for Truck Equipment Catalog #1-10

LB FOSTER CO.

STEEL SHEET PILING • PIPE • WIRE ROPE

PITTSBURGH 30, PA. NEW YORK 7, N.Y.
CHICAGO 4, ILL. HOUSTON 2, TEX.

—Steelmaking trends—

Continued

Higher silica content of less rich ores will affect product quality . . . Many new methods to be used.

the different composition of iron ores and fuels in the future, especially their higher silica content, the composition of the intermediate metal produced by smelting will differ substantially from normal pig iron.

In particular, such metal will generally have a high silica content. This will not greatly complicate the application of oxygen-enriched blowing. Heat required to thoroughly reduce the silica will be released during blowing and therefore make it possible to feed more scrap to the furnace.

ADVANCEMENT OF RESEARCH

The 1952 ASM Medal for the Advancement of Research will go to Cleo F. Craig, President, American Telephone & Telegraph Co., New York. Founded in 1943 by the American Society for Metals, the Research Medal is based upon these qualifications which Mr. Craig fulfills to a high degree. The candidate shall be an executive in an industrial organization, the principal activity of which is the production and fabrication of metals. He shall be one who has consistently sponsored metallurgical research or development.

Metallurgical research forms an important part of the basic scientific studies carried on by the Bell System for the advancement of electrical communication.

During his long service as an engineer in the Bell System and as an executive in the management and in the operating and engineering activities, Mr. Craig has taken keen interest in the improvement and the extension of communication through research.

PERFORMANCE

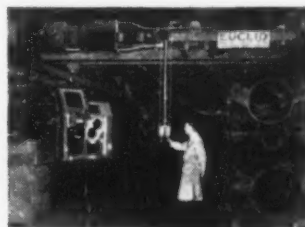
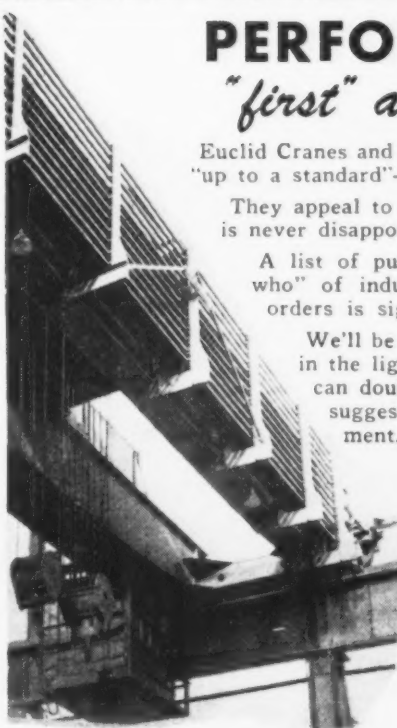
"first" and "foremost"

Euclid Cranes and Hoists have always been built "up to a standard"—never "down to a price."

They appeal to the seeker for quality and he is never disappointed.

A list of purchasers reads like a "whoso who" of industry. The record of repeat orders is significant and impressive.

We'll be glad to discuss your problems in the light of our long experience and can doubtless offer some constructive suggestions as to methods and equipment.



Write for Catalogs.

THE EUCLID CRANE & HOIST COMPANY
1361 CHARDON ROAD, EUCLID, OHIO



Specify...The ABBOTT METHOD

BURNISHING

MATERIALS & BARRELS

for SUPERIOR RESULTS . . .

LONGER OPERATING LIFE

Manufacturers of Deep Hardened and Tempered Carbon Steel Bearing Balls, Grinding and Graining Materials.

THE ABBOTT BALL COMPANY

1094 New Britain Ave., Hartford, Conn.



How To Reach Them

The thousands of purchasing executives, production chiefs, and engineers, all potential BUYERS of your products are among the readers of Iron Age. Your advertisement here can pave the way for your salesmen throughout the metalworking industry.

For information write:

The Iron Age 100 E. 42nd St., NEW YORK 17, N. Y.



The Superior Tube That Puts You "On Target"

Hitting specification bull's-eyes to help our customers hit their production targets is a Superior specialty.

A case in point is illustrated above. The customer, W. R. Weaver Company manufactures high-quality telescopic sights for sporting and target rifles. The carbon steel tube in which the lens elements, reticule and eye piece are mounted must be strong and rigid. Tube material must have excellent machining qualities to permit fast, economical, precision working. Because salability depends a good bit on fine appearance, the tube must be extremely smooth and free from pits and scratches. This is particularly true of the larger sizes where tube ends are expanded, making imperfections more evident. Inside surface must also be smooth and to accurate dimensions.

Ordinarily you might expect tubing to fit such requirements for smoothness plus temper and machinability would be a "premium" item carrying extra charges for special handling.

Not at Superior. Here we can take the most exacting specifications in stride because of our experience and "know-how" backed by highly developed production equipment and extensive research and testing facilities.

If you have need for fine, small tubing to do a tough job well, check with us. We can probably fill your requirements from the stocks of our distributors who are located in principal cities. Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pennsylvania.

BE SURE ABOUT TUBING—
SPECIFY

Superior
THE BIG NAME IN SMALL TUBING

All analyses .010" to 3/4" O.D.
Certain analyses (.035" max. wall)
up to 1 1/2" O.D.

ROUND AND SHAPED TUBING

West Coast: Pacific Tube Company, 5710 Smithway St.,
Los Angeles 22, Calif. UNDERHILL 0-1331.

Available in:

Carbon Steels:

A.I.S.I.—C-1008, MT-1010, MT-1015, C-1118,
MT-1020, C-1025, C-1035, E-1095

Alloy Steels:

A.I.S.I.—4130, 4132, 4140, 4150, 8630,
E-52100

Stainless Steels:

A.I.S.I.—303, 304, 305, 309, 310, 316, 317,
321, 347, 403, 410, 420, 430, 446, T-5

Nickel Alloys:

Nickel, "D Nickel", "L Nickel", "Monel",
"K Monel", "Inconel", 30% Cupro Nickel.

Beryllium Copper:

*Reg. U. S. Trademark
International Nickel Company

Steel Catching Up With Strike-Caused Shortages

Output at 104 pct of capacity or better for the third straight week . . . Shipping facilities strained . . . Specialty items ease . . . Balanced market seen coming in second quarter of 1953.

The steel industry is making giant strides toward relieving intense pressure of demand which built up during the recent 2-month strike. For the third week in a row operations are scheduled at 104 pct of rated capacity or better. This represents an annual production rate of about 113 million net tons of raw steel (The all-time record was hung up last year when the industry turned out 105.1 million net tons of ingots and steel for castings).

Evidence of the terrific production pace is showing up in several places: (1) The market is more orderly; poststrike frenzy of consumers has abated. (2) Shipping facilities are being strained; spot shortages of freight cars are reported. (3) A number of consumers show signs of bumping into 30-day inventory restrictions; others eagerly take up the tonnage. (4) Specialty items—wire, straight-chrome grades of stainless sheets and strip, and silicon sheets are fairly easy; these items historically are among the first to reflect an easing market.

Market Forecast — The above signs are not interpreted to mean that steel supply is close to equaling demand. But they are the forerunners of a balanced market, which THE IRON AGE predicts will come during the second quarter of 1953. Before that a ding-dong battle is expected to develop over decontrol of steel distribution.

Steelmakers will not long acquiesce to controls when they are: (1) Producing the metal faster than consuming industries can chew it up, (2) pledged to a policy of not permitting any defense proj-

ect to suffer from lack of steel, and (3) best qualified to distribute the remainder fairly among their civilian customers.

Why Not Decontrol?—Steel people have read between the lines of some recent statements from Washington, and they believe it is fantastic to suppose that standby control power should be left in the hands of the planners. They will argue that such authority belongs to Congress—and that it should no longer be delegated to administrative planners when the immediate emergency has passed.

But right now they are concentrating on production—particularly on bringing defense production up to date to offset strike losses. It looks as though military business will be caught up by the Nov. 30 deadline—earlier in a few items such as cold-rolled sheets. This will make more steel available for manufacturers of civilian goods.

Car Shortage—Due to emphasis on production and shipments, a shortage of freight cars has developed, especially in the Pittsburgh area. For many mills it's nip-and-tuck maintaining delivery schedules. Most have resorted to the practice of "making" cars by stepping up purchases of incoming materials, thus making more bottoms available for loading finished steel.

The freight car program has bogged down for lack of steel and railroads are lethargic about ordering new cars.

In their production battle steelmakers are getting a lift from a spurt of new capacity that is being completed. A large steel company

is bringing in four new open-hearth furnaces in the Cleveland area. At the same time another producer is bringing in four open-hearths in the Chicago area. Within a period of no more than 6 or 8 weeks these two companies alone will have raised the industry's annual capacity some 1.5 million net tons.

Consumers Optimistic — Steel consumers show every indication of expecting business to continue at a very high level until at least the middle of next year. Though they are no longer panicky in trying to get steel, they are chafing under 30-day inventory restrictions. And some, including auto and appliance makers, are scheduling even higher production, despite the handicap of controls.

Auto production is now geared at almost 20 pct higher than the rate a year ago. In their efforts to boost output, automakers are running smack into a labor shortage in Detroit, an area whose unemployment problem climaxed a crisis in Washington not many months ago. In the face of a still very tight market they are planning to wind up steel conversion during February.

Warehouse Flurry — Warehouse business continues at a very high level. Although shipments of a good range of steel items are being received at a fast clip, there is little chance to rebuild depleted inventories—some hot items don't even get into inventory, being shipped straight to customers.

Steelmaking operations this week are scheduled at 104.5 pct of rated capacity, up half a point from last week. With new capacity coming in, the industry should be able to hold close to or better that high rate almost indefinitely, if demand warrants.

**Here's
all the data
you need**

**ALLEGHENY LUDLUM
STAINLESS PLATES**
Solid and Clad
AND THEIR FABRICATION

ALLEGHENY LUDLUM STEEL CORPORATION
Executive Offices: Pittsburgh, Pa.

on Allegheny Metal Plates

**For certified data on
individual grades of
Stainless Steel, use**

**ALLEGHENY LUDLUM
BLUE SHEETS**

There is a Blue Sheet for each individual grade of Allegheny Metal, giving full information on its physical and chemical properties and characteristics. Let us send you this certified, laboratory-proved data on the stainless grades in which you are interested.

ADDRESS DEPT. A-34

WRITE FOR YOUR COPY!

For any job which involves the handling of large volumes, heat and high pressures—either singly or all at one time—Allegheny Metal solid or clad plates are produced in the exact stainless grade required to combat corrosion, oxidation and contamination of the product.

Some of these grades are new . . . comparatively recent developments of our research and experience as a pioneer and leader in stainless steel production.

Others are improved versions of older analyses. The latest information on the entire subject of stainless plates is available to you in the booklet illustrated above—32 pages of valuable data on types, sizes, finishes, fabricating methods and uses, including ASTM and ASME boiler codes.

Specify "Allegheny Metal" for complete reliability in stainless steel plates, and write for your copy of the A-L Plate Book. ● Address Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.

You can make it **BETTER** with
Allegheny Metal

WED 4877



Market Briefs and Bulletins

Steel Consumption Mounting—Industry leaders say the South's steel consumption last year was more than double its 1940 rate. The increased consumption pace is expected to continue. Of all steel consumed, however, the South still accounts for only 11 pct and produces just 5 pct. On a population basis, it represents 25 pct of the U. S.

Factory Lay-offs Decline—Number of factory lay-offs during August averaged nine for every 1000 workers employed, about one-third the rate for August, 1951, reports Bureau of Labor Statistics. Factory hiring was one-fourth higher than a year ago, running at a rate of 57 per 1000 employees.

Pig Iron Drop—Mystic Iron Works, Everett, Mass., has reduced the base price of foundry pig iron for October, November and December. Price will be \$59.25 instead of \$59.75. Malleable will now be \$59.25 instead of \$60.25.

Same Pace—Western Europe's crude steel production during the second quarter nearly matched the record rate set in the first three months of this year. Output of countries outside the Iron Curtain was moving at an annual rate of 61.9 million metric tons compared with the 62,420,000 ton pace established in the first quarter, according to United Nations Economic Commission.

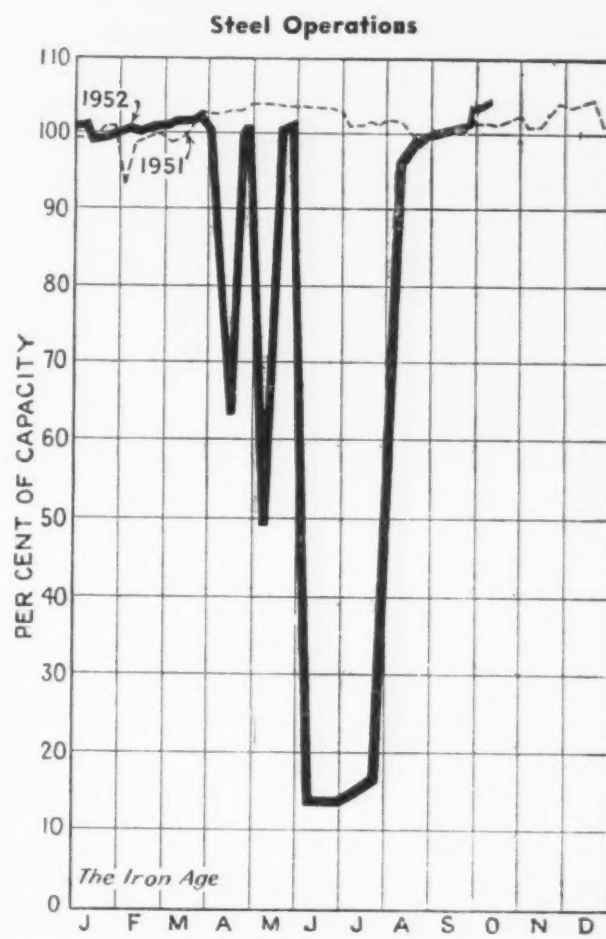
Purchase Manganese—Defense Materials Procurement Agency says it is now ready to receive shipments of manganese ore at its new purchase depots at Wenden, Ariz. Government specs call for ore with a maximum copper-lead-zinc content of 1 pct. Copper content may not be more than 0.25 pct. Ores with higher lead and zinc content are accepted if they can be nodulized to meet requirements.

Wage Hike—Approximately 18,000 non-union employees of Westinghouse Electric Corp. have been granted a pay boost. Increase, if approved by the government, will raise wages of hourly-paid employees 7½¢ to 13¢ per hr. Clerical workers will receive a \$13 to \$22.55 per month wage hike. Supervisory, administrative and professional employees will get a 4 pct increase.

New Pipeline—Consolidated Western Steel Div., U. S. Steel Co., has completed an agreement under which Ebasco Services, Inc., New York, will supply about 40 pct of the 210,000 tons of steel pipe needed for a 960 mile crude oil pipeline to be laid down between Wink, Tex., and Norwalk, Calif.

Coal, Coke Rise—Anthracite coal prices may be raised 20¢ per net ton f.o.b. mines, and coke ceilings may be adjusted as a result of two government actions. Office of Price Stabilization hopes that during the 45-day coverage of the coke pricing order the industry will be able to furnish information needed for a permanent price adjustment.

Mill Expansion—Mill enlargement designed to increase stainless pipe and tubing capacity 40 pct has been started at Carpenter Steel Co.'s Alloy Tube Div., Union, N. J. The new mill addition is expected to be in production by the third quarter of 1953.



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Sept. 28	106.0*	106.5	106.0*	100.0	105.0	104.5	103.0*	109.0	100.0	101.0	90.0	108.0	93.5	104.0
Oct. 6	107.0	106.6	105.0	100.0	109.0	104.5	106.5	106.0	100.0	101.0	93.0	108.1	113.5	104.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised.

Nonferrous Markets

Aluminum Output Losses Mount

Tennessee Valley dry spell caps a tough year . . . Primary and secondary losses total 55,000 tons in second half . . . Demand up . . . Speed essential in third round—By R. L. Hatschek.

Production difficulties in the aluminum industry are mounting even higher. It's already been a hard-luck year with production losses due to storms, steel strike and another low-water season in the Pacific Northwest. Now Tennessee Valley power has been cut as a result of dry weather. Loss will total 4000 tons this month in the Southeast and could continue at 4000 tons a month until the end of the year if the rains don't fall.

The industry fell short of third quarter goals by 25,000 tons and will probably drop 30,000 tons of production in the fourth quarter of 1952, according to National Production Authority. The agency even has some doubts about full production during the first quarter of next year. And 1952 was originally slated to be the first million-ton year in the history of the U. S. primary aluminum industry.

Trim Estimates—Original third quarter estimates put the supply at 362,000 tons, according to administrator R. A. McDonald. But this had to be trimmed to 337,500 tons on account of the steel strike's disruption of the expansion, a tornado at Massena, N. Y., and construction and technical delays.

For the fourth quarter, NPA had expected production amounting to 381,000 tons and had slated more than 15,000 tons for the

stockpile. But loss of hydroelectric power stepped in to compound the industry's troubles.

May Hold Stockpile—It is apparent, NPA explains, that fourth quarter supply will not be more than 350,000 tons—less if the water shortage continues another month or more. Stockpiling may have to go over. Industry is practically pleading to hold off new stockpiling until sometime next year.

For the first quarter NPA had anticipated a rising output of as much as 405,000 tons. But with lower output in the third and fourth quarters, scrap generation and recovery have slacked off. Nor will new capacity be ready according to the original timetable. Estimate has now been revised to an output of perhaps 387,500 tons for the first 3 months of 1953.

Demand Rebounds—According to the government survey, demand which had sagged slightly is on the boom side again. Fourth quarter orders are picking up and attrition is falling off. This can be partly attributed to resumption of manufacturing operations which were slowed by a lack of steel during and after the strike.

Another factor pushing up demand for the light metal was the expectancy of a plentiful supply

by the end of this year. Who could have foreseen the varied assortment of gremlins plaguing production? Washington pushed aluminum as a substitute metal.

Still More Capacity—Munitions Board, in July, substantially increased its stockpile goal and Washington has been kicking around the idea of a third round of expansion ever since. Now the 200,000-ton-a-year goal, based on stockpile plans, has been announced (See p. 200). Emphasis is put on speed in getting the new expansion into production. Target date for completion is Jan. 1, 1955, but the planners would like it now if they could get it.

New Producers—Trying to kill more than one bird, the government wants new producers in this round. Most prominently mentioned in the picture are Kennecott Copper Co. and Olin Industries, Inc., with Spartan Aircraft Co. a lesser possibility. Trouble now is that Justice Dept. is getting choosy again and is at least morally opposed to Kennecott's getting a share. It was similar with Anaconda Copper Mining Co. but that firm is now building a smelter at Columbia Falls, Mont.

Where the new capacity would be located is not known; nor is it known what power source would be used. But it has been rumored that Olin might be the outfit to build a coal-fired plant in West Virginia as mentioned by Sen. Harley M. Kilgore.

Better Not Wait—With rapid erection the prime consideration. Defense Production Administration would probably pass up the newcomers if they don't get on the bandwagon soon. The big three would all like to expand their capacities further and Aluminum Co. of America—which figures it would be the last one asked—is itching to get started on its Alaskan smelter. If approached, Alcoa would ask for this to be put through.

NONFERROUS METAL PRICES

	Oct. 1	Oct. 2	Oct. 3	Oct. 4	Oct. 6	Oct. 7
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.21 $\frac{3}{8}$	\$1.21 $\frac{1}{2}$	\$1.21 $\frac{3}{8}$	....	\$1.21 $\frac{3}{8}$	\$1.21 $\frac{3}{8}$ *
Zinc, East St. Louis	13.75	13.75	13.75	13.75	13.75	13.75
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

*Tentative.



**rare
earths... WISE USES!**



**NOW... WHAT WILL
THEY DO FOR ME?**

New abundance of raw materials obtainable within the United States, newly developed methods of refinement, new knowledge of the properties of Rare Earth substances, new uses tested and definitely proved by the Molybdenum Corporation:

... surely you will be interested in applying to your production the benefits of such discoveries. Ample test-records and other data are available, and are at the service of all who can put them to good use.

The Molybdenum Corporation invites and solicits your inquiry.



AMERICAN Production, American Distribution,
American Control, Completely Integrated

Offices: Pittsburgh, New York, Chicago, Cleveland,
Detroit, Los Angeles, San Francisco

Sales Representatives: American Steel and Supply Co.,
Chicago; Edgar L. Fink, Detroit; Brumley-Donaldson
Co., Los Angeles, San Francisco

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.;
General Tungsten Manufacturing Co., Inc., Union
City, N. J.

Works: Washington, Pa.; York, Pa.

MOLYBDENUM

CORPORATION OF AMERICA
Grant Building Pittsburgh, Pa.



October 9, 1952

399

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)
Flat Sheet: 0.188 in., 2S, 3S, 31.6¢; 4S, 61S-O, 33.6¢; 62S, 35.8¢; 24S-O, 24S-OAL, 24.5¢; 76S-O, 76S-OAL, 41.9¢; 0.081 in., 2S, 3S, 32.8¢; 4S, 61S-O, 35.2¢; 62S, 37.4¢; 24S-O, 24S-OAL, 35.8¢; 76S-O, 76S-OAL, 43.9¢; 0.032 in., 2S, 3S, 34.5¢; 4S, 61S-O, 39.0¢; 62S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 76S-O, 76S-OAL, 54.8¢.

Plate 1/4 in. and heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 62S-F, 33.4¢; 61S-O, 32.3¢; 24S-O, 24S-OAL, 34.0¢; 76S-O, 76S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to 112.2¢; 36 to 38, 45.9¢ to 179.9¢.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 35.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, 1/8 to 1 1/2 in., 56.2¢ to 44.1¢; 3/4 to 1 1/2 in., 43.6¢ to 41.0¢; 1 9/16 to 3 in., 40.4¢ to 37.8¢; 17S-Ts, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 41.5¢ to 30.5¢; 62S, 50.4 to 36.8¢; 66S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 38.9¢.

Extruded Tubing: Rounds, 63S-T5, OD in. in., 1 1/4 to 2, 38.9¢ to 56.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in., x 28 in., per sheet, 72 in., \$1.199; 96 in., \$1.598; 120 in., \$1.997; 144 in., \$2.398. 0.24 in. x 28 in., 72 in., \$1.448; 96 in., \$1.931; 120 in., \$2.414; 144 in., \$2.897. Coiled sheet: 0.019 in. x 28 in., 26.6¢ per lb; 0.024 in. x 28 in., 28.2¢ per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, 1/4 in., 63¢; 3/16 in., 65¢; 1/2 in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., 1/4 to 6.311 in., 74¢; 1/2 to 3/4 in., 57.5¢; 1 1/4 to 1.749 in., 53¢; 2 1/4 to 5 in., 48.5¢. Other alloys higher. Base up to 3/4 in. diam, 10,000 lb; 3/4 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/4 lb, 10,000 lb; 1/4 to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; 1/4 in. to 5/16, \$1.40; 5/16 to 3/4, \$1.26; 3/4 to 5/8, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, 5/8 to 3/4, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in. in.: Up to 1 1/4 in., 10,000 lb; 1 1/4 in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60 1/2
Strip, cold-rolled	83	63 1/4
Rods and bars	73	58 1/2
Angles, hot-rolled	72	58 1/4
Plates	75	59 1/4
Seamless tubes	106	93 1/2
Shot and blocks		53 1/4

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52		45.12
Copper, h-r		41.37	
Copper, drawn		42.62	
Low brass	42.34	42.03	
Yellow brass	40.17	39.86	
Red brass	43.10	42.79	
Naval brass	44.72	38.78	40.04
Leaded brass			38.02
Com's bronze	44.29	44.08	
Mang. bronze	48.44	42.83	43.89
Phos. bronze	64.72	64.97	
Muntz metal	42.69	38.25	39.50
NI silver, 10 pct	51.96	54.18	

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.00
Aluminum pig	19.00
Antimony, American, Laredo, Tex.	39.00
Beryllium copper, 3.75-4.25% Be	\$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$69.50
Bismuth, ton lots	\$2.25
Cadmium, del'd	\$2.00
Cobalt, 97-99% (per lb)	\$2.40 to \$2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$200
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	\$193 to \$195
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide slinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$90 to \$93
Silver, New York, cents per oz.	83.25
Tin, New York	\$1.21 3/4
Titanium, sponge	\$5.00
Zinc, East St. Louis	13.75
Zinc, New York	14.58
Zirconium copper, 50 pct	\$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 100,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	20.5
No. 12 alloy (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASN-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1-85-97 1/2%	18.80
Grade 2-92-95%	18.60
Grade 3-90-92%	18.40
Grade 4-85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33.3
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34.3
Zinc, oval	26 1/4
Ball, anodes	25 1/2
Nickel, 99 pct plus	
Cast	76.00
Roll, depolarized	77.00
Cadmium	\$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	27 1/2
Nickel chloride, 375 lb drum	27 1/2
Silver cyanide, 100 oz lots, per oz.	67 1/2
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1/2¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21 1/2	20 1/2
Yellow brass	19 1/4	17 1/2
Red brass	20 1/4	19 1/4
Comm. bronze	20 1/4	19 1/4
Mang. bronze	18 1/2	17 1/2
Brass rod ends	18 1/4	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Roller brass	15.50
Brass pipe	16.50
Radiators	14.75

Aluminum

Mixed old cast.	9 — 9 1/2
Mixed new clips	10 — 11
Mixed turnings, dry	9 — 9 1/4
Pots and pans	8 1/2 — 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18 1/4 — 19 1/4
No. 2 heavy copper and wire	17 — 17 1/2
Light copper	15 1/2 — 16
New type shell cuttings	15 1/2 — 16
Auto radiators (unsweated)	14 — 14 1/4
No. 1 composition	17 1/2 — 18
No. 1 composition turnings	17 — 17 1/2
Unlined red car boxes	16 1/2 — 17
Cocks and faucets	15 — 15 1/2
Mixed heavy yellow brass	11 1/2 — 12
Old rolled brass	14 1/2 — 15
Brass pipe	15 1/2 — 16
New soft brass clippings	16 — 16 1/4
Brass rod ends	15 1/2 — 16
No. 1 brass rod turnings	15 — 15 1/4

Aluminum

Alum. pistons and struts	6 1/2 — 7
Aluminum crankcases	7 1/2 — 7 3/4
2S aluminum clippings	10 — 10 1/2
Old sheet and utensils	7 1/2 — 8
Borings and turnings	5 — 6
Misc. cast aluminum	7 1/2 — 8
Dural clips (24S)	7 1/2 — 8

Zinc

New zinc clippings	8 — 8 1/2
Old zinc	5 1/2 — 6
Zinc routings	3 1/2 — 4 1/4
Old die cast scrap	4 1/2 — 5

Nickel and Monel

Pure nickel clippings	35 — 36
Clean nickel turnings	35 — 36
Nickel anodes	35 — 36
Nickel rod ends	35 — 36
New Monel clippings	28 — 29
Clean Monel turnings	20 — 21
Old sheet Monel	28 — 29
Nickel silver clippings, mixed	13 — 14
Nickel silver turnings, mixed	12 — 13

Lead

Soft scrap, lead	12 1/2 — 13
Battery plates (dry)	7 — 7 1/2
Batteries, acid free	4 — 5

Magnesium

Segregated solids	15 — 16
Castings	14 — 15

Miscellaneous

Block tin	100
No. 1 pewter	70
No. 1 auto babblitt	55 — 60
Mixed common babblitt	14 1/2 — 14 3/4
Solder joints	19 — 20
Siphon tops	60
Small foundry type	19 — 19 1/2
Monotype	15 1/2 — 16
Lino. and stereotype	13 1/2 — 14
Electrotype	12 — 12 1/2
Hand picked type shells	9 1/2 — 10
Lino. and stereo. dross	7
Electro. dross	6 1/4

- **NON-FERROUS METALS**
- **ORES AND MINERALS**
- **METALLIC RESIDUES**
- **METAL SCRAP**
- **FERRO ALLOYS**

• **ZINC**

YOUR INQUIRIES ARE SOLICITED



MANGANESE ORE

CHROME ORE

TUNGSTEN ORE

Philipph Brothers, Inc.

NEW YORK 5, N. Y., Cables: PHIBRO, New York

AMSTERDAM • MONTREAL • TOKYO • BUENOS AIRES • MONTEVIDEO • LA PAZ • LIMA • CALCUTTA

Iron and Steel Scrap Markets

Are You Stocking Any 'Distress' Scrap?

May issue some licenses to export scrap if economic distress can be proven and certified by NPA . . . Any scrap so classed must first be offered to England . . . What about cast?

If a scrap dealer can get National Production Authority to certify that he is holding "distress" stocks, he may be able to get a license to export this material from Office of International Trade.

Export licenses covering the fourth quarter quota of 36,000 tons have already been issued. Bulk of this scrap will go to Mexico, traditionally dependent on the U. S.

A few licenses may be issued if the holder can prove "extreme economic hardship." Such licenses won't be granted unless the scrap cannot be sold in the U. S. at a reasonable price. In granting "distress" certification, NPA will consider how long the scrap has been in inventory and who is the customer.

Any scrap certified by NPA as "distress" must first be offered to England. Reason is that the U. S. is still short of meeting its promised scrap shipments under the Steel Exchange Agreement.

Cast grades may be the first affected by the OIT "distress" ruling. Some dealers say they can get fair prices for cast on small lot sales but shipments are very lean. Sluggishness in cast is a long-term affliction of many scrap centers. And it may be possible to claim eligibility under the "distress" clause on the basis that cast won't move at fair prices—and many times at any price.

Pittsburgh—Inventory of yard scrap in the area is thin. Reports here and from other districts indicate this situation is widespread. Mill inventories generally are ample, but some electric furnace mills apparently are scraping bottom of the barrel. An independent consumer bought a limited tonnage of openhearth material on \$5 springboard. A large mill is expected to come

into the market this week. Cast market is tending toward weakness.

Chicago—Steelmaking grades continued to move well here last week. There was some apprehension over blast furnace grades and a number of reports of difficulty in moving electric furnace grades. Cast continued off. Despite increasing mill inventories, however, openhearth scrap was firm and moving well. At the dealer level there was considerable eagerness to cover orders for the next 2 weeks, apparently in the belief that there might be a weakening in No. 2 heavy melting and No. 2 bundles during that period. There was no confirmation of this expected weakening in sales reported here.

Philadelphia—Some of the larger consumers of foundry grades in this area are beginning to get inventory-conscious. Result is that buying of cast scrap has dropped off lately. Steel mills are also reported reluctant to purchase either charging box cast or heavy breakable. Blast furnace grades remain at ceiling but less interest is being shown in short shovelings. Electric furnace and openhearth material moves along with no pushing from well-stocked buyers.

New York — The market here was stable. Steelmaking grades held their strength although consumers pursued non-aggressive purchasing policies. Stockpiles of scrap remained high. Some shippers in this area complain bitterly over the shortage of freight cars and say the situation is now worse than at anytime before. Cast continued weak.

Detroit—Scrap continues in good demand with most of the market strength coming from consumers within the area. The artificial shortage here is still part of the steel strike hangover when a non-striking mill prevented build-up of inventories. A lot of scrap that normally would be directed out of the area is remaining here and dealers are enjoying an excellent demand.

Cleveland—Demand for all grades is good, with prices holding at ceiling. Dealers say blast furnace grades are hard to move. Cast scrap is still at ceiling but consumers are limiting springboards. Yard scrap is scarce.

St. Louis—Shipments of No. 2 heavy melting grades of scrap iron from the country have been very light, and the automobile wreckers have stopped dismantling cars pending resale of spare parts. Dealers' yards are almost depleted, but steel mills have good inventories into which they are eating. Cast iron grades are in the doldrums. Some are selling at ceiling prices or lower delivered.

Birmingham — Openhearth scrap continues to move north from this area, but not in so much volume as a couple of weeks ago. In some instances mills have made purchases, then ordered shipments held up until space is available. Dealers report supplies are becoming scarce and they do not expect much replenishment until the end of cotton picking, when farmers will again be bringing in scrap. Cast scrap is more plentiful, but not bountiful, and prices are unchanged.

Cincinnati — Cast prices here are weaker in face of slow demand. No. 1 cupola and stove plate are off \$2. Electric furnace grades are in strong demand. Consumers and dealers say scrap is not coming in, and yard situation stays tight. Most mills have well-stocked inventories and are not interested in allocations.

Boston — Steelmaking grades continue to move steadily with all prices at ceiling. The cast market is still very weak, although some grades rose \$1 from last week.

West Coast—Cast prices in the San Francisco area slipped to \$43 last week, but in Los Angeles remained firm at \$50. Some dealers in northern California shipped tonnage to Los Angeles. Market is expected to weaken soon, however. On steelmaking grades dealers are still reported pressuring for export licenses. Some mill buyers privately believe this is a move to boost the price back to ceiling. One major mill representative said he expects no return to ceiling in the West before the end of the year.

For the Purchase or Sale of Iron and Steel Scrap...

CONSULT OUR NEAREST OFFICE



The energy and integrity of our organization is ready to serve your best interests ...
Since 1889, Luria Brothers & Company, Inc. have made fair dealings their constant aim.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP **LURIA BROTHERS AND COMPANY, INC.**

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE),
READING, PENNA. MICHIGAN
MODENA, PENNA. PITTSBURGH, PENNA.
ERIE, PENNA.



OFFICES
BIRMINGHAM, ALA. DETROIT, MICH. PITTSBURGH, PENNA.
BOSTON, MASS. HOUSTON, TEXAS PUEBLO, COLORADO
BUFFALO, N. Y. LEBANON, PENNA. READING, PENNA.
CHICAGO, ILLINOIS LOS ANGELES, CAL. ST. LOUIS, MO.
CLEVELAND, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.
SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

October 9, 1952

Scrap Prices

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

GRADES	OPS No.	Basing Points															
		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Mansfield	Sharon	Youngstown	Canton	Warren	Warren	Warren	Cleveland	Buffalo	Cincinnati	Chicago
No. 1 bundle	1	\$44.00							\$44.00					\$43.00			\$42.50
No. 1 busheling	2	44.00							44.00					43.00			42.50
No. 1 heavy melting	3	43.00							43.00					42.00			41.50
No. 2 heavy melting	4	43.00							43.00					42.00			41.50
No. 2 bundles	5	43.00							43.00					42.00			41.50
Machine shop turnings	6	34.00							34.00					33.00			32.50
Mixed borings and turnings	7	38.00							38.00					37.00			36.50
Shoveling turnings	8	38.00							38.00					37.00			36.50
Cast iron borings	10	38.00							38.00					37.00			36.50
No. 1 chemical borings	20	41.00							41.00					40.00			39.50
Forge crops	11	51.50							51.50					50.50			50.00
Bar crops and plate	12	49.00							49.00					48.00			47.50
Punchings and plate	14	46.50							46.50					45.50			45.00
Electric furnace bundles	15	46.00							46.00					45.00			44.50
Cut struc., plate, 3 ft and less	16	47.00							47.00					46.00			45.50
Cut struc., plate, 2 ft and less	17	49.00							49.00					48.00			47.50
Cut struc., 1 ft and less	18	50.00							50.00					49.00			48.50
Foundry steel, 2 ft and less	20	44.00							44.00					43.00			42.50
Foundry steel, 1 ft and less	21	46.00							46.00					45.00			44.50
Heavy trimmings	24	43.00							43.00					42.00			41.50
No. 1 RR heavy melting	RR 1	46.00							46.00					45.00			44.50
Scrap rails, random lengths	RR 14	48.00							48.00					47.00			46.50
Scrap rails, 3 ft and less	RR 16	51.00							51.00					50.00			49.50
Scrap rails, 2 ft and less	RR 17	52.00							52.00					51.00			50.50
Scrap rails, 18 in. and less	RR 18	54.00							54.00					53.00			52.50
Revolving rails	RR 15	53.00							53.00					52.00			51.50
Unrot tires	RR 20	48.00							48.00					47.00			46.50
Cut tires	RR 21	51.00							51.00					50.00			49.50
Cut bolsters and side frames	RR 23	49.00							49.00					48.00			47.50
RR specialties	RR 24, 28, 29	51.00							51.00					50.00			49.50
Solid steel axles	RR 25	58.00							58.00					57.00			56.50
No. 3 steel wheels	RR 27	51.00							51.00					50.00			49.50
Unassorted	RR 35	40.08							40.08					39.00			38.50

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	\$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron car wheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry remout or prepared cupola drops is 75 pct of corresponding grade.

Under Ceiling Scrap Prices

Pittsburgh

Machine shop turnings	\$32.00
Mixed borings, turnings	32.00
Cast iron borings	\$35.00 to 35.50
No. 1 machinery cast	52.00
Heavy breakable cast	45.00
Malleable	55.00

Chicago

Low phos. forge crops	\$50.00 to \$51.00
Low phos. 3 ft and under	44.00 to 45.00
Cut struc., plate, 2 ft & less	45.00 to 46.00
Cut struc., plate, 3 ft & less	43.50 to 44.50
Machine shop turnings	30.00 to 31.50
Mixed borings, turnings	34.00 to 35.50
Shoveling turnings	34.00 to 35.50
Cast iron borings	34.00 to 35.50
Cupola cast	45.00 to 46.00
Heavy breakable cast	41.00 to 42.00
Malleable	52.00 to 55.00
Stove plate	42.00 to 43.00
Clean auto cast	48.00 to 50.00
Charging box cast	44.00 to 45.00
Drop broken mach'y	48.00 to 49.00
Unstripped motor blocks	36.00 to 38.00

Philadelphia Area

Clean cast chem. borings	\$36.50 to \$37.00
Cupola cast	47.00 to 48.00
Unstripped motor blocks	41.00 to 42.00
Charging box cast	45.00 to 46.00

Cleveland

Cast iron borings	\$34.00 to \$34.50
Stove plate	45.00 to 46.00
Malleable	54.00 to 55.00

Youngstown

Cast iron borings	\$35.00 to \$35.50
-------------------	--------------------

Buffalo

No. 1 machinery cast	\$49.00 to \$50.00
No. 1 cupola cast	46.00 to 47.00

Birmingham

Shoveling turnings	\$30.00 to \$32.00
Cast iron borings	30.00 to 32.00
No. 1 cupola cast	46.00 to 47.00
Stove plate	41.00 to 42.00
Charging box cast	39.00 to 40.00
Heavy breakable	37.00 to 38.00
Drop broken machinery	44.00 to 45.00
Unstripped motor blocks	37.00 to 38.00

New York

Brokers' Buying prices per gross ton, on cars:	
Clean cast chem. borings	\$30.00 to \$30.50
No. 1 machinery cast	48.00 to 50.00
Mixed yard cast	33.00 to 44.00
Charging box cast	43.00 to 44.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	36.00 to 37.00

Boston

Brokers' Buying prices per gross ton, on cars:	
Machine shop turnings	\$24.17
Short shoveling turnings	28.17
Mixed cupola cast	\$40.00 to 41.00
Heavy breakable cast	39.00 to 40.00
Stove plate	38.00 to 39.00
Unstripped motor blocks	30.00 to 31.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 cupola cast	\$48.00
Heavy breakable cast	\$43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron brake shoes	39.00 to 40.00

Cincinnati

No. 1 cupola cast	\$49.00
Stove plate	46.00
Drop broken cast	\$51.00 to \$52.00

St. Louis

Charging box cast	\$43.00 to \$44.00
No. 1 cupola cast	43.00
Heavy breakable cast	41.00 to 42.00
Unstripped motor blocks	\$38.00

San Francisco

No. 2 heavy melting	\$31.00
No. 2 bundles	29.00
Machine shop turnings	17.00
No. 1 cupola cast	43.00

Los Angeles

No. 2 heavy melting	\$31.00
No. 2 bundles	29.00
Machine shop turnings	17.00
Shoveling turnings	20.00
No. 1 cupola cast	50.00

Seattle

No. 2 bundles	\$29.00
No. 1 cupola cast	40.50
Heavy breakable	35.50

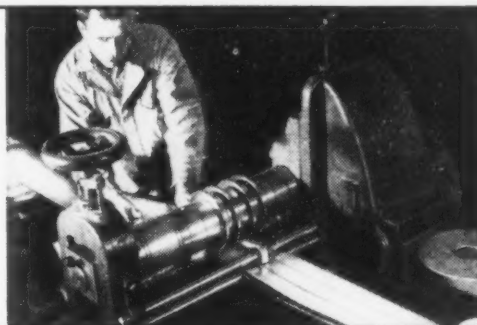
Hamilton, Ont.

No. 1 hvy. melting	\$35.50
No. 1 bundles	35.50
No. 2 bundles	35.00
Mechanical bundles	33.50
Mixed steel scrap	31.50
Mixed borings, turnings	32.50
Rails, remelting	35.50
Rails, rerolling	44.80
Bushelings	30.50
Bush, new fact. prep'd	33.50
Bush, new fact. unprep'd	32.50
Short steel turnings	32.50
Cast scrap	50.00

CHASE[®] warehouses from coast to coast offer complete metal cutting services!

These 11 Chase
warehouses do
SLITTING

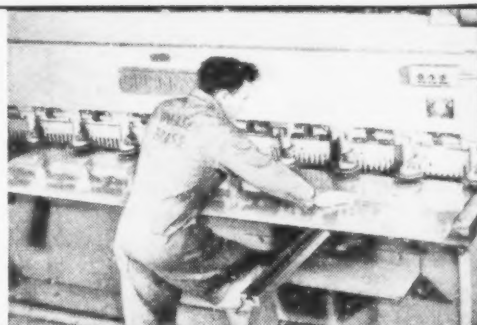
CINCINNATI
PROVIDENCE
LOS ANGELES
INDIANAPOLIS
CHICAGO
PHILADELPHIA
MILWAUKEE
ST. LOUIS
DETROIT
NEW YORK
NEWARK



These 7 Chase
warehouses do
SHEARING

CHICAGO
PHILADELPHIA
MILWAUKEE
ST. LOUIS
DETROIT
NEW YORK
NEWARK

*These warehouses also
do slitting*



These 5 Chase
warehouses do
SAWING

PITTSBURGH
* DETROIT
* NEW YORK
* NEWARK
* CHICAGO

** These warehouses
also do slitting
and shearing*



VISIT the Chase booth
no. 1200 at the National
Metal Congress and Con-
vention.

When it comes time for slitting,
shearing or sawing, check the Chase
Warehouses listed above for the
cutting facilities each of them have.

Naturally, this work is done to
your specifications on orders for
metals we are able to fill. We'll help

out, too, on *your* brass, bronze,
copper, aluminum, steel, fibreboard
or other materials. Just tell us how
you want it. The work will be done
accurately and to your liking.

As usual—call Chase for service!

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

* The Nation's Headquarters for Brass & Copper

Albany†	Cleveland	Kansas City Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston†	Newark	Rochester†	
Cincinnati	Indianapolis	New Orleans	St. Louis	† sales office only

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Oct. 7 1952	Sept. 30 1952	Sept. 9 1952	Oct. 9 1951
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga.)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Strains C-R strip (No. 302)	36.75†	36.75†	36.75†	36.75

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$8.95	\$8.95	\$8.95	\$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50

Bars and shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	\$15.00†	\$15.00†	\$15.00†	\$15.00
Wrought iron bars	10.05	10.05	10.05	9.50

Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢

Rails: (per 100 lb)				
Heavy rails	\$3.775	\$3.775	\$3.775	\$3.60
Light rails	4.25	4.25	4.25	4.00

Semifinished Steel: (per net ton)				
Re-rolling billets	\$59.00	\$59.00	\$59.00	\$56.00
Slabs re-rolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	66.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00

Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	2.35

† Add 4.7 pct.

Composite: (per pound)				
Finished steel base price	4.376¢	4.376¢	4.376¢	4.131¢

Pig Iron: (per gross ton)	Oct. 7 1952	Sept. 30 1952	Sept. 9 1952	Oct. 9 1951
Foundry, del'd Phila.	\$60.69	\$60.69	\$60.69	\$57.97
Foundry, Valley	55.00	55.00	55.00	52.50
Foundry, Southern, Cin'ti	58.93	58.93	58.93	55.58
Foundry, Birmingham	51.38	51.38	51.38	48.88
Foundry, Chicago	55.00	55.00	55.00	52.50
Basic del'd Philadelphia	59.77	59.77	59.77	57.09
Basic, Valley furnace	54.50	54.50	54.50	52.00
Malleable, Chicago	55.00	55.00	55.00	52.50
Malleable, Valley	55.00	55.00	55.00	52.50
Charcoal, Chicago	78.34	78.34	78.34	70.66
Ferromanganese	226.25	226.25	226.25	186.25

† The switching charges for delivery to foundries in the Chicago district is \$1 per ton.

‡ Average of U. S. prices quoted on Ferroalloy pages.

Composite: (per gross ton)				
Pig iron	\$55.26	\$55.26	\$55.26	\$52.72

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$43.00*	\$43.00*	\$43.00*	\$44.00*
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	42.50*
No. 1 steel, Chicago	41.50*	41.50*	41.50*	42.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos., Youngstown	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	49.00†
No. 1 cast, Philadelphia	47.50	47.50	48.50	49.00†
No. 1 cast, Chicago	45.50	45.50	46.50	49.00†

* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

Composite: (per gross ton)				
No. 1 heavy melting scrap	\$42.00	\$42.00	\$42.00	\$43.00

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.75	\$14.75	\$14.75	\$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.21½	\$1.21½	\$1.21½	\$1.03
Zinc, East St. Louis	13.75	13.75	14.00	19.50
Lead, St. Louis	15.80	15.80	15.80	18.80
Aluminum, virgin ingot	20.00	20.00	20.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index re-capitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

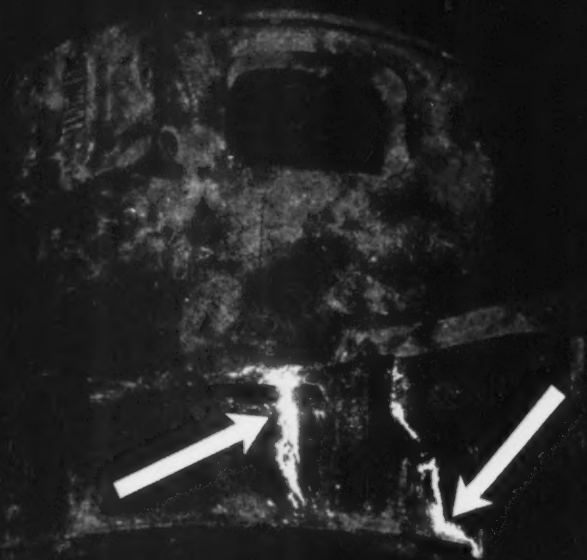
Exceptions: (1) 500 to 1499 lb, (2) 1500 to 3499 lb, (3) 6000 lb or over, (4) 450 to 1499 lb.

WARE HOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets		Strip		Plates Shapes		Bars		Alloy Bars			
		Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	\$.20	5.81	7.17	8.42-8.57	6.42	.....	6.30-6.47	6.47	6.41	7.18-7.43	.....	.....	.....
Birmingham	.15	5.80	6.65	7.70	5.80	.....	6.10	5.95	5.80	8.25-8.40	.....	.....	.....
Boston	.20	6.48	7.35	8.59	6.55	8.50	6.75	6.56	6.38	7.10-7.54	10.75	11.15	13.18
Buffalo	.20	5.76	6.60	8.40	6.16	6.19	6.26	5.96	5.76	6.00-6.95	10.70	11.00	12.51
Chicago	.20	5.80	6.65	8.05	5.83	5.84	6.37	6.08	5.90	6.95	11.07	12.70	14.42
Cincinnati	.15	6.13	6.72	8.52	6.21	.....	6.47	6.42	6.13	6.56-6.92	10.65	11.07	12.65
Cleveland	.20	5.80	6.65	8.16	6.00	.....	6.12-6.22	6.28	5.89	6.66-6.98	10.79	11.07	12.79
Denver	.....	7.17	.....	.....	7.43-7.69	8.90	7.37	7.50	7.61	8.24	.....	.....	.....
Detroit	.20	6.00	6.81	8.34	6.13	7.99	6.45	6.12	6.12	6.975-7.21	10.72	10.92	13.02
Houston	.20	6.74	7.78	8.65	6.61	9.80	6.63	6.66	6.82	9.00-9.62	11.90	11.90	13.90
Indianapolis del'd	.....	.....	.....	.....	.....	.....	7.07	6.79	6.98	.....	.....	.....	.....
Kansas City	.20	6.47	7.31	8.50-8.72	6.51	8.07	6.62-6.67	6.62	6.50	7.57	11.15-11.90	11.45	13.13
Los Angeles	.20	6.60	8.45	9.50	6.74	9.15	6.66-6.71	6.60	6.60	8.36-8.69	12.05	13.88	14.60
Memphis	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milwaukee	.20	5.97	6.82	8.02	6.00	.....	6.12-6.17	6.12	6.00	6.83-7.07	10.82	12.82	.....
New Orleans	.15	6.28	7.12	.....	6.32	.....	6.43	6.43	6.31	7.85	.....	.....	.....
New York	.30	6.26	7.27	8.31	6.56	9.53	6.60-7.19	6.39	6.59	7.53	10.74	11.04	13.04
Norfolk	.20	6.69	7.60	8.68	7.05	.....	6.64	6.70	6.89	8.05	10.98	11.28	13.27
Philadelphia	.25	6.11	7.13	8.35	6.45	.....	6.24-6.66	6.42	6.42	7.45-7.69	10.57	10.79	12.79
Pittsburgh	.20	5.80	6.65	8.05	5.94	.....	5.95	5.95	5.83	6.66	11.02	12.65	12.65
Portland	.20	5.81	.....	8.45	5.97	.....	6.00	7.05	7.30	7.35	9.46	.....	.....
Salt Lake City	.20	7.60	9.00	9.70	7.60	.....	7.85	8.00	8.40	.....	.....	.....	.....
San Francisco	.15	6.80	8.23	9.70	6.79	9.25	7.10	6.79	6.65	8.40	11.85	14.40	.....
Seattle	.20	6.90	10.05	8.80	7.40	.....	7.19	6.83	7.40	9.31	.....	.....	.....
St. Louis	.20	6.10	6.95	8.35	6.14	9.73	6.35	6.35	6.13	6.96	10.65	10.95	12.65
St. Paul	.15	6.30	7.83	8.39	.....	.....	6.60	6.61	6.49	7.32	.....	.....	.....

**what
happened
here?**



... and why it saved plenty to find out

These are "invisible" cracks in a casting. They were discovered and made visible in rough state by inspection with Zyglo, one of Magnaflux' many methods used to detect defects.

If these cracks occurred in just one piece, it wouldn't be so important. But if they happen in 1,000—or 100,000—that's different. If the defects aren't found until *after* machining, it's costly. Early detection prevents an exorbitant waste of material, time, manpower and profits!

This looking beyond *effect* to find *cause* and *correction*, is what we at Magnaflux mean by process control. No matter what *you* make—or what materials you work with—the chances are that one or another of our methods can

help you reduce costs by finding defects and correcting their cause at the most economical stage of production.

Manufacturers of everything from dishes to diesel locomotives are profiting through such use of Magnaflux' Methods. They include some of the foremost and most efficient producers in the world! One of them says, "It's just common sense"... and another that "It's trading dimes for dollars."

Why not find out right now what process control through Magnaflux' Methods can do for *you*? There's an interesting new Bulletin on the subject that we'll be glad to send you if you'll mail the coupon.

MAGNAFLUX' INSPECTION METHODS

available for—

Detecting defects in magnetic and nonmagnetic metals
... ceramics ... glass ... plastics ... powdered metals
Stress measurement and analysis
Rapid thickness measurements from one side only
High-speed quantitative and qualitative measurement
and evaluation of parts, materials and assortments



Reg. U.S. Pat. Office

MAGNAFLUX

MAGNAFLUX CORPORATION

5902 Northwest Highway, Chicago 31, Illinois
New York 36 • Cleveland 15 • Detroit 11 • Los Angeles 58 • Dallas 9



MAGNAFLUX CORPORATION

5902 Northwest Highway, Chicago 31, Illinois

Please send me a copy of your bulletin on profitable process control through Magnaflux' Methods.

Name

Company Name

Address

City Zone State

STEEL PRICES

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					<i>\$76.00 B3</i>			<i>3.90 B3</i>	<i>5.80 B3</i>				
	Buffalo, N. Y.			<i>\$59.00 B3</i>	<i>\$70.50 B3, R3</i>	<i>\$76.00 B3, R3</i>		<i>4.675 B3</i>	<i>3.90 B3</i>	<i>5.80 B3</i>	<i>3.725 B3, R3</i>	<i>5.10 B3</i>	<i>5.70 B3</i>	<i>7.90 B3</i>
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				<i>\$77.50 A2</i>	<i>\$83.00 A2</i>					<i>4.125 A2</i>		<i>5.90 A2</i>	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			<i>\$59.00 B3</i>	<i>\$70.50 B3</i>	<i>\$76.00 B3</i>			<i>3.90 B3</i>	<i>5.80 B3</i>	<i>3.725 B3</i>			
	Newark, N. J.													
	New Haven, Conn.											<i>5.60 A5</i> <i>5.85 D1</i>		
	Phoenixville, Pa.								<i>6.10 P2</i>					
	Putnam, Conn.													
	Sparrows Pt., Md.										<i>3.725 B3</i>	<i>5.10 B3</i>	<i>5.70 B3</i>	<i>7.90 B3</i>
	Worcester, Mass.													
MIDDLE WEST	Trenton, N. J.											<i>6.45 R4</i>		
	Alton, Ill.										<i>4.20 L1</i>			
	Ashland, Ky.										<i>3.725 A7</i>			
	Canton-Massillon, Ohio				<i>\$70.50 R3</i>	<i>\$76.00 R3</i> <i>\$78.60 T5</i>								
	Chicago, Sterling, Ill.			<i>\$59.00 U1</i>	<i>\$70.50 U1, R3, W8</i>	<i>\$76.00 U1, R3, W8</i>		<i>4.675 U1</i>	<i>3.85 U1, W8</i>	<i>5.80 U1</i>	<i>3.725 A1, W8</i> <i>4.725 N4</i>	<i>5.35 A1</i>		
	Cleveland, Ohio				<i>\$70.50 R3</i>							<i>5.10 A5, J3</i>		<i>7.45 J3</i>
	Detroit, Mich.	<i>\$56.00 R5</i>	<i>\$57.00 R5</i>		<i>\$73.50 R5</i>	<i>\$79.00 R5</i>					<i>4.025 G3</i> <i>4.40 M2</i>	<i>5.30 G3</i> <i>5.45 M2</i> <i>5.60 D1</i> <i>6.05 D2</i>	<i>6.30 G3</i>	<i>8.15 G3</i>
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			<i>\$59.00 U1</i>	<i>\$70.50 U1</i>	<i>\$76.00 U1, Y1</i>		<i>4.675 I3</i>	<i>3.85 I3, U1</i>	<i>5.80 I3, U1</i> <i>6.30 Y1</i>	<i>3.725 I3, U1, Y1</i>	<i>5.35 I3</i>	<i>5.65 I3, U1</i> <i>6.15 Y1</i>	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											<i>5.10 A7</i>		
	Niles, Ohio Sharon, Pa.										<i>4.225 S1</i>	<i>5.80 S1</i>	<i>5.65 S1</i>	<i>7.30 S1</i>
WEST	Pittsburgh, Pa.	<i>\$54.00 U1</i>	<i>\$57.00 U1</i>	<i>\$59.00 U1, J3</i>	<i>\$70.50 U1, J3</i>	<i>\$76.00 U1</i>	<i>3.55 U1</i> <i>3.65 J3</i>	<i>4.675 U1</i>	<i>3.85 U1, J3</i>	<i>5.80 U1, J3</i>	<i>3.725 J3, A7</i> <i>3.975 A3</i> <i>4.225 S7, S9</i>	<i>5.10 J3, A7</i> <i>5.45 A3</i> <i>5.80 B4, S7</i>		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								<i>4.10 W3</i>		<i>3.825 W3</i>	<i>5.10 W3</i>	<i>6.10 W3</i>	<i>7.95 W3</i>
	Youngstown, Ohio					<i>\$76.00 Y1, C10</i>	<i>3.55 U1, R3</i>			<i>6.30 Y1</i>	<i>3.725 U1, Y1, R3</i>	<i>5.10 R3, Y1</i> <i>5.70 C5</i> <i>5.80 B4</i>	<i>5.65 R3, U1</i> <i>6.15 Y1</i>	<i>7.30 R3</i> <i>7.80 Y1</i>
	Fontana, Cal.	<i>\$81.00 K1</i>	<i>\$83.00 K1</i>	<i>\$78.00 K1</i>	<i>\$89.50 K1</i>	<i>\$95.00 K1</i>			<i>4.45 K1</i>	<i>6.40 K1</i>	<i>4.975 K1</i>	<i>6.75 K1</i>	<i>6.55 K1</i>	
	Geneva, Utah				<i>\$70.50 C7</i>				<i>3.85 C7</i>	<i>5.80 C7</i>				
	Kansas City, Mo.								<i>4.45 S2</i>		<i>4.325 S2</i>			
SOUTH	Los Angeles, Torrance, Cal.				<i>\$89.50 B2</i>	<i>\$96.00 B2</i>			<i>4.45 C7, B2</i>	<i>6.35 B2</i>	<i>4.475 C7, B2</i>	<i>6.85 C1</i>	<i>6.40 B2</i>	
	Minnequa, Colo.								<i>4.30 C6</i>		<i>4.775 C6</i>			
	San Francisco, Niles, Pittsburg, Cal.				<i>\$89.50 B2</i>				<i>4.40 B2</i> <i>4.56 P9</i>	<i>6.30 B2</i>	<i>4.475 C7, B2</i>		<i>6.40 B2</i>	
	Seattle, Wash.				<i>\$89.50 B2</i>				<i>4.50 B2</i>	<i>6.40 B2</i>	<i>4.725 B2</i>		<i>6.65 B2</i>	
	Atlanta, Ga.										<i>4.275 A8</i>			
	Birmingham, Ala. Alabama City, Ala.			<i>\$59.00 T2</i>	<i>\$70.50 T2</i>				<i>3.85 T2, R3</i>	<i>5.80 T2</i>	<i>3.725 T2, R3</i>			
	Houston, Texas		<i>\$65.00 S2</i>		<i>\$78.50 S2</i>	<i>\$84.00 S2</i>			<i>4.25 S2</i>		<i>4.125 S2</i>			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE

Hi Str.
C.R., Low
Alloy

7.90 B3

7.90 B3

7.45 J3

8.15 G3

7.30 S1

7.95 W3

7.30 R3

7.80 Y1

1952

SHEETS

WIRE
ROD

TINPLATE†

BLACK
PLATE

STEEL
PRICES

Hot-rolled 15 ga. 2-hvyt.	Cold- rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Tern 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
3.775 B3	4.575 B3				5.675 B3	6.925 B3							Bethlehem, Pa.
													Buffalo, N. Y.
													Claymont, Del.
													Coatesville, Pa.
4.175 A2					5.925 A2								Conschocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 B3				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.775 B3	4.575 B3	5.075 B3			5.675 B3	6.925 B3	7.775 B3		4.425 B3	\$8.80 B3	\$7.50 B3		Sparrows Pt., Md.
									4.625 A5				Worcester, Mass.
									4.425 R4				Trenton, N. J.
									4.70 L1				Alton, Ill.
3.775 A7		5.075 A7	4.925 A7										Ashland, Ky.
		5.075 R3											Canton-Massillon, Ohio
3.775 W8					5.675 U1				4.325 A5, N4,R3				Chicago, Sterling, Ill.
3.775 R3, J3	4.575 R3, J3		4.925 R3		5.675 R3, J3	6.925 R3, J3			4.325 A5				Cleveland, Ohio
3.975 G3	4.775 G3				6.225 G3	7.475 G3							Detroit, Mich.
													Duluth, Minn.
3.775 I3, U1, Y1	4.575 I3, U1, Y1	5.075 I3, U1	4.925 U1	5.475 U1	5.675 I3, U1	6.925 I3, U1	7.425 Y1		4.325 Y1	\$8.70 U1, I3, Y1	\$7.40 U1, I3	6.10 U1, Y1	Gary Ind. Harbor, Indiana
4.30 G2	5.275 G2	5.50 G2	5.625 G2								\$7.60 G2	6.30 G2	Granite City, Ill.
		5.475 C9											Kokomo, Ind.
	4.575 A7		4.925 A7	5.475 A7									Middletown, Ohio
4.175 S1					5.675 S1						\$7.40 R3		Niles, Ohio
													Sharon, Pa.
3.775 U1, J3, A7	4.575 U1, J3, A7	5.075 U1	4.925 U1		5.675 U1, J3	6.925 U1, J3	7.625 U1		4.325 A5	\$8.70 U1, J3	\$7.40 U1, J3	6.10 U1	Pittsburgh, Pa.
3.925 A3									4.525 P7				Portsmouth, Ohio
3.775 W3, W5	4.575 W3, W5	5.075 W3, W5		5.475 W3, W5	6.025 W3	7.275 W3				\$8.70 W3, W5	\$7.40 W3, W5	6.35 W5	Weirton-Wheeling, Follansbee, W. Va.
3.775 U1, R3, Y1	4.575 R3, Y1	5.775 R1	4.925 Y1	6.05 E2	5.675 R3, U1	6.925 R3, 7.425 Y1		5.65 E2 5.825 R1	4.325 Y1	\$8.70 R3			Youngstown, Ohio
4.725 K1	5.525 K1				6.625 K1	7.875 K1			5.125 K1				Fontana, Cal.
3.875 C7													Geneva, Utah
													Kansas City, Mo.
4.475 C7		5.825 C7						5.575 C7	5.125 C7,B2				Los Angeles, Torrance, Cal.
									4.575 C6				Minnequa, Colo.
4.475 C7	5.525 C7	5.825 C7							4.975 C7	\$9.45 C7	\$8.15 C7		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.775 T2, R3	4.575 T2	5.075 T2, R3			5.675 T2			4.925 R3	4.325 T2, R3	\$8.80 T2	\$7.50 T2		Birmingham, Ala.
									4.725 S2				Alabama City, Ala.
													Houston, Tex.

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES

	BARS						PLATES				WIRE
	Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's Bright
EAST	Bethlehem Pa.			4.675 B3	6.00 B3	5.925 B3					
	Buffalo N. Y.	3.95 B3,R3	3.95 B3,R3	4.975 B5	4.675 B3,R3	6.00 B3,B5	5.925 B3	3.90 B3		5.95 B3	
	Claymont Del.						4.35 C4		5.35 C4		
	Coatesville Pa.						4.35 L4		5.75 L4		
	Conschocken Pa.						4.35 A2	4.95 A2		6.20 A2	
	Harrisburg Pa.						6.50 C3	6.50 C3			
	Hartford Conn.			5.475 R3		6.45 R3					
	Johnstown Pa.	3.95 B3	3.95 B3		4.675 B3		5.925 B3	3.90 B3		5.25 B3	5.95 B3
	Newark N. J.			5.375 W10		6.35 W10					
	New Haven Conn.										
	Phoenixville Pa.										
	Putnam Conn.			5.475 W10							
	Sparrows Pt. Md.		3.95 B3				3.90 B3		5.25 B3	5.95 B3	5.325 B3
	Worcester Mass.				6.35 A5						5.525 A5
	Trenton N. J.										
MIDDLE WEST	Allen Ill.	4.50 L1									5.45 L1
	Ashland Ky.						3.90 A7				
	Canton-Massillon	3.95 R3		4.925 R2,R3	4.675 R3 4.72 T5	5.99 T5 6.00 R2,R3					
	Chicago Sterling Ill.	3.95 U,W8, R3, 4.55 N4	3.95 R3 4.70 N4	4.925 A5,B5, W8,W10	4.675 R3 U1, W8	6.00 B5,L2, R3,W8,W10 6.05 A5	3.90 U1, W8	4.95 U1	5.25 U1	5.95 U1	5.225 A3, N4,R3 5.325 K2 5.475 W7
	Cleveland Ohio	3.95 R3	3.95 R3	4.925 A5,C13		6.00 C13 6.05 A5	5.925 R3	3.90 R3,J3	4.95 J3		5.95 R3,J3
	Detroit Mich.	4.10 R5 4.30 G3		5.075 R5,P8 5.175 P3	4.825 R5 5.025 G3	6.15 R5,P8 6.20 P3	6.675 G3	4.45 G3			6.90 G3
	Duluth Minn.										5.252 A5
	Gary Ind. Harbor Indiana	3.95 I3,U1, Y1	3.95 I3,U1, Y1	4.925 L2, M5,R3	4.675 I3,U1, Y1	6.90 L2,M5, R3,R5	5.925 I3,U1, 6.425 Y1	3.90 I3,U1, Y1	4.95 I3	5.25 U1	5.95 I3,U1 6.45 Y1
	Granite City Ill.						4.60 G2				
	Kokomo Ind.										5.325 C9
	Middletown Ohio										
	Niles Ohio Sharon Pa.						4.15 S1		5.70 S1	5.95 S1	
	Pittsburgh Pa.	3.95 U1,J3	3.95 U1,J3	4.925 A5,J3, W10,R3,C8	4.675 U1,J3	6.00 W10,C8 6.05 A5	5.925 U1,J3	3.90 U1,J3	4.95 U1,J3	5.25 U1,J3	5.95 U1,J3
	Portsmouth Ohio										5.625 P7
	Weirton Wheeling Follansbee W. Va.	4.10 W3					3.90 W5 4.20 W3				
	Youngstown Ohio	3.95 U1,Y1, R3	3.95 U1,Y1, R3	4.925 Y1	4.675 U1,C10, Y1	6.00 C10,Y1	5.925 U1 6.425 Y1	3.90 U1,Y1, R3		5.95 R3 6.45 Y1	5.225 Y1
WEST	Fontana Cal.	4.65 K1	4.65 K1		5.725 K1		6.975 K1	4.50 K1		6.20 K1	6.55 K1
	Geneva Utah							3.90 C7		5.95 C7	
	Kansas City Mo.	4.55 S2	4.55 S2		5.275 S2						5.825 S1
	Los Angeles Torrance Cal.	4.65 C7,B2	4.65 C7,B2	6.375 R3	5.725 B2		6.625 B2				6.175 C7,B1
	Minnequa Colo.	4.40 C6	4.75 C6					4.70 C6			5.475 C6
	San Francisco Niles Pittsburg Cal.	4.65 C7,P9 4.70 B2	4.65 C7,P9 4.70 B2				6.675 B2				6.175 C6,C7
	Seattle Wash.	4.70 B2	4.70 B2				6.675 B2	4.80 B2		6.85 B2	
	Atlanta Ga.	4.50 A8	4.50 A8								5.475 A8
SOUTH	Birmingham Ala. Annama City Ala.	3.95 T2,R3	3.95 T2,R3			5.925 T2	3.90 T2,R3			5.95 T2	5.225 T2, R3
	Houston Tex.	4.35 S2	4.35 S2		5.075 S2		4.30 S2				5.625 S2

Turn Page

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Clad Metals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Ceneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh

P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

MERCHANT WIRE PRODUCTS

	Standard & Coated Nails	Woven Wire Fence 9-15 1/2 ga.	Fence Posts	Single Loop Bale Ties	Twisted Barbed Wire	Gal. Barbed Wire	Merch. Wire Ann'd	Merch. Wire Gal.
Fob Mill	Col	Col	Col	Col	Col	Col	Col	Col
Alabama City R3*	118	135	132	144	6.075	6.325		
Aliquippa Pa J3	127	141		148	6.075	6.525		
Atlanta A8	130	140	135	149	6.325	6.675		
Bartonsville K2	127	138	140	132	147	6.075	6.45	
Buffalo W6								
Cleveland A6					6.075	6.225		
Cleveland A5					6.075	6.55		
Crawfordsville M4	130	140	134	149	6.175	6.55		
Donora Pa A5*	118	133	132	142	6.075	6.225		
Dubuoh A5*	118	133	132	142	6.075	6.225		
Fairfield Ala T2*	118	133	132	142	6.075	6.225		
Houston S2	135	147		156	6.475	6.925		
Johnston Pa B3	127		149		6.075			
Joliet Ill A5*	118	133	132	142	6.075	6.225		
Kokomo Ind C9			142		6.175	6.425		
Los Angeles B2					7.025			
Kansas City S2	139		144	160	6.675	7.125		
Minneapolis C6*	123	146	138	153	6.325	6.70		
Monessen P6								
Moline Ill R3			136					
Pittsburgh Col C7*	137	156	156	162	7.025	7.125		
Pittsburgh P6	127	138		147	6.075	6.45		
Portsmouth P7	132				6.47			
Rankin Pa A5*	118	133		142	6.075	6.225		
So Chicago R3*	118	135	140	132	144	6.075	6.325	
S San Fran C6			156	167	7.025	7.40		
Sparrows Pt B3	129		134	151		6.675		
Sterling Ill Y4	127	138	132	147	6.075	6.45		
Struthers O Y1					6.075	6.475		
Torrance Cal C7*	138				7.025			
Worcester A5*	124				6.375	6.525		
Williamsport Pa S10								

Cut Nails carloads base \$7.80 per 100 lb. (less 20¢ to jobbers) at Conshohocken Pa. (A2) Wheeling W. Va. (W5) \$7.80.

* Add 45¢ per 100 lb. on Std. & Coated Nails.

† Zinc extra if not included on Galv. Merch. Wire.

‡ Galv. Merch. Wire based on 15¢ Zinc.

STAINLESS STEELS

Base price, cents per lb., f.o.b. mill. Add 4.7 pct

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—Sheets: Midland, Pa., C11 Brackenridge, Pa., A3 Butler, Pa., A7 McKeesport, Pa., U1 Washington, Pa., W2 (type 316 add 4.5¢) J2 Baltimore, E1 Middletown, O., A7 Massillon, O., R3 Gary, U1 Bridgeville, Pa., U2 New Castle, Ind., I2 Ft. Wayne, J4 Lockport, N. Y., R4.

Strip: Midland, Pa., C11 Cleveland, A5 Carnegie, Pa., S9 McKeesport, Pa., F1 Reading, Pa., C2 Washington, Pa., W2 (type 316 add 4.5¢) W. Leeburg, Pa., A3 Bridgeville, Pa., U2 Detroit, M2 Canton-Massillon, O., R3 Middletown, O., A7 Harrison, N. J., D3 Youngstown, C5 Lockport, N. Y., S4 Sharon, Pa., S1 (type 301 add 1/4¢): Butler, Pa., A7 Wallingford, Conn., A7.

Bars: Baltimore, A7 Duquesne, Pa., U1 Munhall, Pa., U1 Resling, Pa., C2 Titusville, Pa., U2 Washington, Pa., J2 McKeesport, Pa., U1 Ft. Bridgeville, Pa., U2 Dunkirk, N. Y., A3 Massillon, O., R3 Chicago, U1 Syracuse, N. Y., C11 Watervliet, N. Y., A3 Waukegan, A5 Lockport, N. Y., S4 Canton, O., T5 Ft. Wayne, J4.

Wires: Waukegan, A5 Massillon, O., R3 McKeesport, Pa., F1 Ft. Wayne, J4 Harrison, N. J., D3 Baltimore, A7 Dunkirk, A3 Monessen, P1 Syracuse, C11 Bridgeville, U2.

Structurals: Baltimore, A7 Massillon, O., R3 Chicago, Ill., J4 Watervliet, N. Y., A3 Syracuse, C11.

Plates: Brackenridge, Pa., A3 (type 416 add 1/4¢): Butler, Pa., A7 Chicago, U1 Munhall, Pa., U1 Midland, Pa., C11 New Castle, Ind., I2 Lockport, N. Y., S4 Middletown, A7 Washington, Pa., J2 Cleveland, Massillon, R3.

Forged discs, die blocks, rings: Pittsburgh, C11 Syracuse, C11 Ferndale, Mich., A3 Washington, Pa., J2.

Forging billets: Midland, Pa., C11 Baltimore, A7 Washington, Pa., J2 McKeesport, F1 Massillon, Canton, O., R3 Watervliet, A3 Pittsburgh, Chicago, U1; Syracuse, C11.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

Miscellaneous Prices

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD														SEAMLESS					
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2-3 In.		3 1/2-4 In.	
	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.	Blik.	Gal.
STANDARD T. & C.																				
Sparrows Pt. B3	30.5	8.25	33.5	12.25	35.5	15.75	36.5	16.25	37.0	17.25	37.5	17.75	38.0	18.25						
Youngstown R3	32.5	10.25	35.5	14.25	38.0	17.75	39.4	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Fontana K1	21.0	+1.25	24.0	2.75	26.5	6.25	27.0	6.75	27.5	7.75	28.0	8.25	28.5	8.75						
Pittsburgh J3	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	24.0	2.25	27.0	5.75	29.0	7.75
Alton Ill. L1	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Sharon M3	32.5	9.25	35.5	13.25	38.0	16.25	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.25						
Pittsburgh N1	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0		27.0		29.0	
Wheeling W5	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Wheatland W4	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75						
Youngstown Y1	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Indiana Harbor Y1	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Lorain N2	32.5	15.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
E&TRA STRONG																				
PLAIN ENDS																				
Sparrows Pt. B3	30.25	9.5	34.25	13.5	36.25	17.0	36.75	17.5	37.25	18.5	37.75	19.0	38.25	19.5						
Youngstown R3	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Fontana K1	20.75		24.75		26.75		27.25		27.75		28.25		28.75							
Pittsburgh J3	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	23.75	2.0	27.75	6.5	31.25	10.0
Alton Ill. L1	29.25	8.5	33.25	12.5	35.25	16.0	35.75	16.5	36.25	17.5	36.75	18.0	37.25	18.5						
Sharon M3	32.25	10.5	36.25	14.5	38.25	17.5	38.75	18.0	39.25	18.5	39.75	19.0	40.25	19.5						
Pittsburgh N1	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75		27.75		31.25	
Wheeling W5	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Wheatland W4	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0						
Youngstown Y1	32.25	11.5	36.25	15.5	37.75	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	22.5	23.75	4.5	27.75	8.5	31.25	12.0
Indiana Harbor Y1	31.25	10.5	35.25	14.5	37.25	17.5	37.75	18.5	38.25	19.5	38.75	20.0	39.25	20.5						
Lorain N2	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0

Galvanized discounts based on zinc, at 17¢ per lb. East St. Louis. For each 1¢ change in zinc, discounts vary as follows: 1/2 in., 3/4 in., and 1 in., 1 pt.; 1 1/4 in., 1 1/2 in., 2 in., 3/4 pt.; 2 1/2 in., 3 in., 1/2 pt. Calculate discounts on even cents per lb. of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb. use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only butt-weld and seamless, 1 pt. higher discount. Plain ends, butt-weld and seamless, 3 in. and under 3 1/2 pts. higher discount. Butt-weld jobbers' discount, 5 pct. St. Louis zinc price now 13.5¢.

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50 to \$15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$17.50 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$26.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Palmsville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.60
Cleveland, del'd	25.72
Cincinnati, del'd	28.00
St. Paul, f.o.b.	22.60
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length	Armature	Elec.	Meter	Dynamo	Transf. 72	Transf. 65	Transf. 58
F.o.b. Mill Cents Per Lb.							
Beech Bottom W5	7.85	9.10	9.90	10.45	11.00	11.70	
Brackenridge A3	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City G2	8.55	9.80					
Ind. Harbor J3	7.35	7.85	9.10				
Mansfield E2	7.35	7.85	9.10	9.90			
Niles, O. N3	7.35	7.85					
Vandergrift U1	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. R3	7.35	7.85	9.10				
Zanesville A7	7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	\$105.30 to \$108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$123.00 to \$130.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	23.93	28.14	23.19	27.28
	2 1/2	12	32.17	37.83	31.19	36.67
	3	12	35.78	42.11	34.69	40.82
	3 1/2	11	44.72	52.65	43.36	51.05
	4	10	55.52	65.31	53.83	63.32
National Tube	2	13	22.81	27.94	22.23	
	2 1/2	12	31.28	38.31	30.51	
	3	12	35.87	43.93	34.98	
	3 1/2	11	42.56	52.12		
	4	10	54.02	66.16		
Pittsburgh Steel	2	13		28.58		
	2 1/2	12	32.16	39.19		
	3	12	36.87	44.93		
	3 1/2	11	43.76	53.32		
	4	10	55.54	67.68		

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill		CARBON CONTENT				
		0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. S7						
Carnegie, Pa. S9		7.65	8.25	10.20	12.50	
Cleveland A5	5.10	7.30	8.25	10.20	12.50	
Detroit D1	6.45	7.50	8.810			
New Castle, Pa. B4	5.80	7.65	8.25	10.20		
New Haven, Conn. D1	6.70	7.60	8.20			
Sharon, Pa. S1	5.80	7.65	8.25	10.20	12.50	
Trenton N. J. R4		7.95	8.55	10.50	12.50	
Weirton W. Va. W3	5.80	7.65	8.25	10.20	12.50	
Worcester, Mass. A5	5.40	7.60	8.55	10.50	12.50	
Youngstown C3		7.65	8.25	10.20	12.50	

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem B1	56.50	57.00	57.50	58.00			
Birmingham R3	50.88	51.38					
Birmingham W9	50.88	51.38					
Birmingham S5	50.88	51.38					
Buffalo R3	54.50	55.00	55.50				
Buffalo H1	54.50	55.00	55.50			66.75	
Buffalo W6	54.50	55.00	55.50				
Chicago J4	54.50	55.00	55.00	55.50			
Cleveland A5	54.50	55.00	55.00	55.50	59.50		
Cleveland R3	54.50	55.00	55.00				
Dainierfield, Tex. L3	50.50	51.00	51.00				
Duluth I4	54.50	55.00	55.00	55.50			
Erie I4	54.50	55.00	55.00	55.50			
Everett, Mass. M6		59.25	59.75				
Fontana K1	60.50	61.00					
Geneva, Utah C7	54.50	55.00					
Granite City, Ill. K3	56.40	56.90	57.40				
Hubbard, Ohio Y1	54.50	55.00	55.00				
Ironton, Utah C7	54.50						
Jackson, Ohio J1 G1						65.50	
Lyle, Tenn. T3							68.50
Minnequa C6	56.50	57.50	57.50				
Monessen P6	56.50						
Neville Island P4	54.50	55.00	55.00	55.50			
Pittsburgh U1	54.50			55.50			
Sharpsville S3	54.50	55.00	55.00	55.50			
Steelton B3	56.50	57.00	57.50	58.00	62.50		
Swedeland A2	58.50	59.00	59.50	60.00			
Toledo I4	54.50	55.00	55.00	55.50			
Troy, N. Y. R3	56.50	57.00	57.50		62.50		
Youngstown Y1	54.50	55.00	55.00	55.50			
N. Tonawanda, N. Y. T1		55.00	55.50				

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery iron: Add \$1.50 per ton net for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferro-silicon prices are \$1 over comparable silvery iron.

Miscellaneous Prices

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer U1	3.775	4.25	4.925				
Chicago R3				6.65			
Cleveland R3							
Ensley T2	3.775	4.25					
Fairfield T2		4.25		6.65		4.775	
Gary U1	3.775	4.25				4.775	
Ind. Harbor B3	3.775		4.925	6.65		4.775	
Johnstown B3		4.25					
Joliet U1		4.25	4.925				
Kansas City S2							
Lackawanna B3	3.775	4.25	4.925			4.775	
Lebanon B3				6.65			
Minnequa C6	3.775	4.75	4.925	6.65		4.775	9.85
Pittsburgh R3							
Pittsburgh O1							
Pittsburgh P5							
Pittsburgh J3				6.65			
Pittg. Cal. C7						4.925	
Seattle B2				7.15		4.925	
Steelton B3	3.775		4.925			4.775	
Struthers Y1				6.65			
Terrance C7						4.925	
Youngstown R3				6.65			

TOOL STEEL

F.o.b. mill
Add 4.7 pct

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.505
18	4	1	—	5	\$2.13
18	4	2	—	—	\$1.65
1.5	4	1.6	8	—	81.0¢
6	4	2	6	—	96.5¢
High-carbon chromium					68.5¢
Oil hardened manganese					35¢
Special carbon					32.5¢
Extra carbon					27¢
Regular carbon					23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. L4	*29.5	
Washington, Pa. J2	*29.5	
Claymont, Del. C4	*28.00	
Conshohocken, Pa. A2		*27.50
New Castle, Ind. I2	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. L4	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. L4	40.5	
Monel-carbon		
10 pct Coatesville, Pa. L4	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. A4		77.00
Aluminized steel sheets, hot dip, Butler, Pa. A7		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b. plant threaded
electrodes with nipples, unboxed

Diam. in. in.	Length in. in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2 1/2	24, 30	23.15
2	24, 30	25.36
CARBON		
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

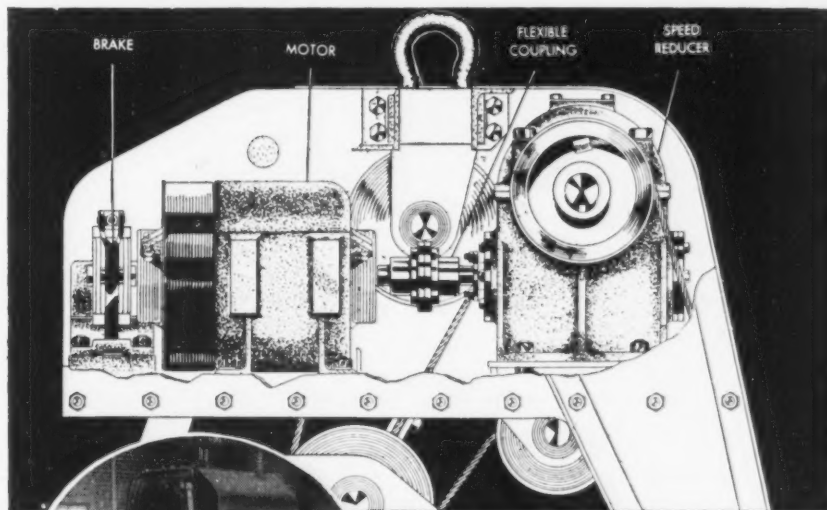
FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.
Price, net ton; Effective CaF₂ content:
76% or more \$43.00
60% or less 40.00

FILLING AN INDUSTRIAL ORDER. Craftsman starting to "spindown" stainless steel guard bowl for laboratory centrifuge unit. An example of the all-gage — all-metal — any quantity — spinning capacity available at Teiner. Write for newest color brochure 52 F



ROLAND TEINER
CO. INC. 134 TREMONT ST., EVERETT 49, MASS.



HOOK 'ER ON—PLUG 'ER IN

ABOVE YOU SEE WHY the Erie Electric Bucket works in its own headroom controlled from the crane cab. This sturdily constructed bucket needs only to be hooked over the crane hook and power line plugged in. The man in the cab controls the opening of the bucket from cracking the lips to any degree of opening or closing. The extra in-built weight permits easy penetration. Write for complete particulars
ERIE STEEL CONSTRUCTION CO
9210 GEIST ROAD • ERIE PA



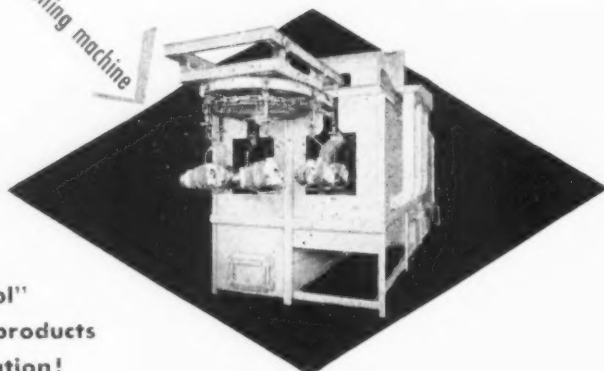
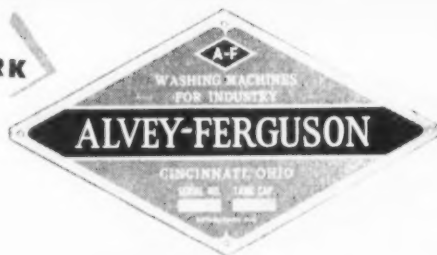
ERIE

BUCKETS • BINS • AGGREGATORS
ELECTRIC OVERHEAD TRAVELING CRANES
PORTABLE CONCRETE PLANTS
VERTICAL BUCKET ELEVATORS

STEEL CONSTRUCTION CO., ERIE, PA.

THIS A-F TRADEMARK

on your metal products washing machine



Means

"quality control"

in your metal products washing operation!

* Visit Our
BOOTH No. 530
National Metal Exposition
Philadelphia
October 20-24

ALVEY-FERGUSON

THE ALVEY-FERGUSON COMPANY
567 DISNEY ST. SINCE 1901 CINCINNATI 9, OHIO
OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES

Here's
Efficient
Welding



On
C-F

Positioners

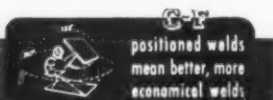
When heavy, unwieldy weldments like these diesel crankcases can be quickly swung into any position so that every weld is made downhand—that's efficient welding!

Welders spend more time welding — do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

Write for Bulletin WP24 — an illustrated circular detailing the Specific advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.
1303 S. Kilbourne Ave., Chicago 23

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.



Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pet Off List		Less	
	Keg.	K.	Keg.	K.
1/2 in. & smaller	15	28 1/2	15	28 1/2
9/16 in. & 5/8 in.	12	25	6 1/2	21
3/4 in. to 1 1/2 in.	9	23	1	16 1/2
Inclusive	7 1/2	22	1	16 1/2

Nuts, Hot Pressed—Hexagon

1/2 in. & smaller	26	37	22	34
9/16 in. & 5/8 in.	16 1/2	29 1/2	6 1/2	21
3/4 in. to 1 1/2 in.	12	25	2	17 1/2
Inclusive	8 1/2	23	2	17 1/2

Nuts, Cold Punched—Hexagon

1/2 in. & smaller	26	37	22	34
9/16 in. & 5/8 in.	23	35	17 1/2	30 1/2
3/4 in. to 1 1/2 in.	19 1/2	31 1/2	12	25
Inclusive	8 1/2	23	2	17 1/2

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
1/2 in. & smaller	35	45	28 1/2	29 1/2
9/16 in. & 5/8 in.	23	35	17 1/2	30 1/2
3/4 in. to 1 1/2 in.	24	36	15	28 1/2
Inclusive	13	26	8 1/2	23
1 7/16 in. & smaller	35	45		
1 1/2 in. thru 5/8 in.	28 1/2	39 1/2		
3/4 in. to 1 1/2 in.	26	37		

Stove Bolts

Pet Off List	
Packaged, steel, plain finish	48—10
Packaged, plain finish	31—10
Bulk, plain finish	42*
*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.	
**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.	

Rivets

Base per 100 lb	
1/2 in. & larger	\$7.85

Cap and Set Screws

(In bulk)		Pet Off List	
		Less	C
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 5/8 in. x 6 in., SAE 1020, bright	54		
3/4 in. thru 1 in. up to & including 6 in.	48		
1/2 in. thru 5/8 in. x 6 in. & shorter	44		
high C double heat treat	41		
3/4 in. thru 1 in. up to & including 6 in.	36		
Milled studs	16		
Flat head cap screws, listed sizes	34		
Fillister head cap, listed sizes	53		
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter			

Machine and Carriage Bolts

		Pet Off List	
		Less	C
1/2 in. & smaller x 6 in. & shorter	15	28 1/2	
9/16 in. & 5/8 in. x 6 in. & shorter	18 1/2	30 1/2	
3/4 in. & larger x 6 in. & shorter	17 1/2	29 1/2	
All diam. longer than 6 in.	14	27 1/2	
Lag, all diam. x 6 in. & shorter	23	35	
Lag, all diam. longer than 6 in.	21	33	
Flow bolts	34		

Miscellaneous Prices—

REFRACTORIES

Fire Clay Brick	Carloads, per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5) . . .	\$94.60
No. 1 Ohio . . .	\$8.00
Sec. quality, Pa., Md., Ky., Mo., Ill. . .	\$8.00
No. 2 Ohio . . .	\$7.20
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50) . . .	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick

Standard chemically bonded Balt. Chester	Per Net Ton
	\$82.00

Magnesite Brick

Standard, Baltimore	\$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite St. 1/2-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	\$62.70
Domestic, f.o.b. Chewelah, Wash. in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ . . .	\$13.75
--	---------

LAKE SUPERIOR ORES

\$1.50% Fe; natural content, delivered lower Lake ports. Prices effective July 26, 1952

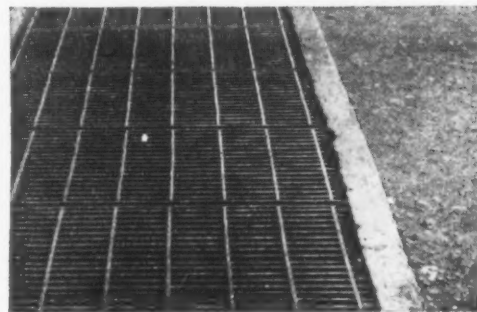
	Gross Ton
Old range, bessemer	\$9.45
Old range, nonbessemer	9.30
Mesabi, bessemer	9.20
Mesabi, nonbessemer	9.05
High phosphorus	9.05

After adjustments for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.	
Swedish sponge iron c.l.f. New York, ocean bags	10.9¢
Canadian sponge iron, del'd, in East	12.0¢
Domestic sponge iron, 98+ % Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+ % Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+ % Fe. 63.0¢ to 80.0¢	
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+ % Fe. 83.0¢ to \$1.48	
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic, 10.75¢ plus metal value	
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quantity, del'd	\$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	\$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	87.00¢
Stainless steel, 316	\$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	\$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

Hendrick Heavy-duty Grating . . .



has wide range of usefulness

withstands weight of heaviest trucking, inside or outside of industrial plants . . . excellent for drainage applications . . . for coal grizzlies . . . and wherever it is necessary to sustain unusually heavy loading.

In prominent steel casting plant, Hendrick heavy-duty grating used for breakout floors has paid for itself many times over in reclaimed sand.

Bearing bars range in size from 2 1/4" x 3/8" to 4" x 3/8"; cross bars from 2" x 5/16" to 2 1/2" x 5/16"; to meet requirements of loading conditions. Write for complete specifications.



Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Milco Open Steel Flooring,
Shur-Site Treads, Armorgrids

HENDRICK

Manufacturing Company

37 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities



LOCK JOINT

Now You can fill your needs with HELICAL TUBING



Welded and Cold Drawn Stainless Steel Tubing

Special Purpose Tubing In All Available Materials

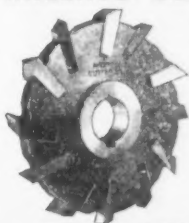
As Welded

For full detailed information about Helical Tubing send today for your HETCO Catalog.

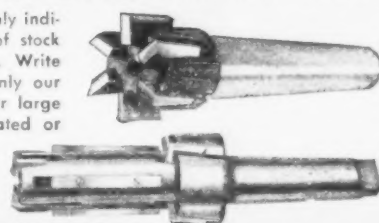
HELICAL TUBE CORPORATION
19 Washington St., East Orange, N. J.
Manufacturing Plant—Grand Rapids, Michigan

APEX INSERTED-BLADE TOOLS METAL-CUTTING TOOLS

MILLING CUTTERS STOCKED IN OVER TWENTY TYPES



The mills shown here are only indications of the large line of stock and special Apex designs. Write for catalog showing not only our milling cutters but also our large single point line with serrated or round shank tool bits, many of the latter interchangeable and usable in other standard holders.



APEX TOOL & CUTTER CO., Inc., Shelton 12, Conn.



CLARK
QUALITY INDUSTRIAL FASTENERS SINCE 1854

Bolts . . . Nuts . . . Rivets
... Screws—have provided
their users with the same
dependable uniform quality
and accuracy of finish for almost
a Century.

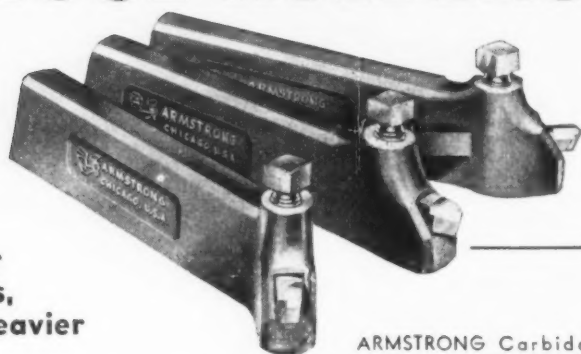
For Greater Security...
Fasten Fast with Clark Fasteners

CLARK BROS BOLT CO.
MILDALE, CONN.

**BOLTS • NUTS
RIVETS • SCREWS**

6-M-1c

ARMSTRONG *Carbide* TOOL HOLDERS



**For
Higher
Speeds,
and Heavier
Feeds**

Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

ARMSTRONG Carbide Tool
Holders and ARMIDE (Carbide



**Write for Catalog
ARMSTRONG BROS. TOOL CO.**

"The Tool Holder People"

5209 WEST ARMSTRONG AVE., CHICAGO 30, ILLINOIS
NEW YORK • SAN FRANCISCO

Ferroalloy Prices

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C ...	30.50	0.20% C ...	29.50
0.10% C ...	30.00	0.50% C ...	29.25
0.15% C ...	29.75	1.00% C ...	29.00
2.00% C ...			28.75
65-69% Cr, 4-9% C ...			22.00
62-66% Cr, 4-6% C, 6-9% Si ...			22.50

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads ...	21.50
Ton lots ...	23.75
Less ton lots ...	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads ...	27.75
Ton lots ...	30.05
Less ton lots ...	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C ...	\$1.14
0.50% max. C ...	1.10
9 to 11% C ...	1.05

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed: lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads ...	19.00
Ton lots ...	22.10
Less ton lots ...	23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads ...	20.00
Ton lots ...	22.30
Less ton lots ...	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots ...	20.75
Less ton lots ...	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots ...	17.50
Less ton lots ...	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots ...	16.50
Less ton lots ...	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. SI 48 to 52%, TI 9 to 11%, Ca 5 to 7%.

Carload packed ...	18.00
Ton lots to carload packed ...	19.00
Less ton lots ...	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabua, O. ...	\$235
F.o.b. Johnstown, Pa. ...	\$227
F.o.b. Sheridan, Pa. ...	\$235
F.o.b. Etna, Clairton, Pa. ...	\$228
Add \$2.80 for each 1% above 82% Mn, subtract \$2.80 for each 1% below 82% Mn.	

Briquets—Cents per pound of briquet delivered, 66% contained Mn.

Carload, bulk ...	1.45
Ton lots, packed ...	1.05

Con-
loads
29.50
29.75
29.00
28.75
22.00
22.60
chro-
4-6%
21.00
23.75
25.35
% Si,
27.75
30.05
31.85
5% N,
n fer-
each
con-
97%
\$1.14
1.10
1.08
(max.)
lagara
down,
f con-
tained
d con-
ned Si
dump
x. Fe,
19.00
22.10
23.60
alloy
20.00
22.30
23.80
alloy,
18-21%
13.50-
00% C,
20.75
22.00
f alloy,
7% Zr,
17.50
19.50
Susten-
d, max
9% Si,
16.50
17.75
b. Sus-
allowed,
to 11%
18.00
19.00
20.50
ct base
22.25
22.21
22.25
22.21
2% Mn,
ow 5%
briquet
17.45
1.08



Greater Tonnage
Per Edge of Blade

AMERICAN
SHEAR KNIFE CO.
HOMESTEAD · PENNSYLVANIA

Ferroalloy Prices

Spiegeleisen

Contract prices gross ton; lump, f.o.b.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Palmerton, Pa. \$84.00 \$85.00
Pgh. or Chicago 84.00 85.00

Manganese Metal

Contract basis, 2 in. x down, cents per
pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max.
Si, 2.5% max. Fe.
Carload, packed 36.95
Ton lots 38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed
east of Mississippi, cents per pound.
Carloads 30.00
Ton lots 32.00
Less ton lots 34.00 to 37.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn con-
tained, lump size, del'd Mn 85-90%.
Carloads Ton Less
0.07% max. C, 0.06%
P, 90% Mn 28.45 30.30 31.50
0.07% max. C 27.95 29.80 31.00
0.15% max. C 27.45 29.30 30.50
0.30% max. C 26.95 28.80 30.00
0.50% max. C 26.45 28.30 29.50
0.75% max. C, 80-85% Mn,
5.0-7.0% Si 23.45 25.30 26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract
price, carloads, lump, bulk, delivered, per
lb of contained Mn 21.35¢

Silicomanganese

Contract basis, lump size, cents per
pound of metal, delivered, 65-68% Mn,
18-20% Si, 1.5% max. C. For 2% max. C,
deduct 0.2¢.
Carload bulk 11.40
Ton lots 13.05
Briquet, contract basis carlots, bulk
delivered, per lb of briquet 12.65
Ton lots, packed 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk,
Iowa, or Wenatchee, Wash., \$95.00 gross
ton, freight allowed to normal trade area.
Si 15.01 to 15.50 pct, f.o.b. Niagara Falls,
N. Y., \$93.00. Add \$1.00 per ton for each
additional 0.50% Si up to and including
17%. Add \$1.00 for each 0.50% Mn over
1%.

Silicon Metal

Contract price, cents per pound con-
tained Si, lump size, delivered, for ton lots
packed.
96% Si, 2% Fe 18.00
97% Si, 1% Fe 18.50

Silicon Briquets

Contract price, cents per pound of
briquet bulk, delivered, 40% Si, 2 lb Si
briquets.
Carloads, bulk 6.95
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound con-
tained Si, lump, bulk, carloads, delivered.
25% Si 20.00 75% Si 14.30
50% Si 12.40 85% Si 15.55
90-95% Si 17.00

Calcium Metal

Eastern zone contract prices, cents per
pound of metal, delivered.
Cast Turnings Distilled
Ton lots \$2.05 \$2.95 \$3.75
Less ton lots.. 2.40 3.30 4.55

Ferrovanadium

35-55% contract basis, delivered,
per pound, contained V.
Openhearth \$3.00-\$3.10
Crucible 3.10- 3.20
High speed steel (Primus).. 3.20- 3.25



Consider the real savings in
time and money with the IN-
DUSTRIAL PACKAGE PLAN.
Commercial Contracting
Corporation's experienced en-
gineers are equipped with fa-
cilities for complete construc-
tion, engineering, installation
of machinery or equipment
and delivery of a completed
project ready for production.

**One Contract
One Contractor
One Responsibility**

AND THESE SERVICES

General Construction • Building Alter-
ations • Demolition • Foundations •
Press Erecting • Machinery Moving •
Crane and Conveyor Installations •
Process Wiring and Piping • Ware-
housing • Steel Fabrication • Export
Packaging



Write for information
on the Industrial Pack-
age Plan — Complete
Brochure on Request —
No Obligation, of
course.

**COMMERCIAL
CONTRACTING**

Corporation

GENERAL CONTRACTORS

**12160 CLOVERDALE
DETROIT 4, MICHIGAN
TEXAS 4-7400**

Ferroalloy Prices

Alaifer , 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload, bulk lump	9.90
Ton lots	11.30
Calcium molybdate , 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo	\$1.15
Ferrocolumbium , 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.	
Ton lots	\$4.90
Less ton lots	4.95
Ferro-Tantalum-Columbium , 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	\$3.75
Ferromolybdenum , 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	\$1.32
Ferrophosphorus , electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	\$75.00
Ferrotitanium , 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.35
Ferrotitanium , 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.50
Less ton lots	1.55
Ferrotitanium , 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	\$177.00
Ferrotungsten , standard, lump or 1/4 x down, packed, per pound contained W5, ton lots, delivered	\$5.00
Molybde oxide , briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	\$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	\$1.13
Simanal , 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium Pentoxide , 86 - 89% V ₂ O ₅ contract basis, per pound contained V ₂ O ₅	\$1.28
Zirconium , 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy	
Ton lots	21.00¢
Zirconium , 12-15%, contract basis, lump, delivered, per lb of alloy	
Carload, bulk	7.00¢
Boron Agents	
Boroall , contract prices per lb of alloy del f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B	\$5.25
Bortam , f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Corbortam , Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed	
Ton lots, per pound	10.00¢
Ferroboron , 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots	\$1.20
F.o.b. Wash., Pa.; 100 lb up	
10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50
Grainal , f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over	
No. 1	\$1.00
No. 4	.68¢
No. 79	.60¢
Manganese - Boron , 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd	
Ton lots	\$1.46
Less ton lots	1.57
Nickel-Boron , 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered	
Less ton lots	\$1.80
Sticenz , contract basis, delivered	
Ton lots	45.00¢

STEEL MILL EQUIPMENT—FOR SALE

On account of reorganization of our Steel Works, in connection with the erection of a Blooming and Slabbing Mill, we offer for sale:

- 7 Steel ladles, capacity of each 90 tons of liquid steel.
- 2 Rotating casting machines for teeming the above steel ladles into ingot moulds. Capacity 120 tons. Each machine journals on a pivot at one side, at the other side it is supported on a circular rail of 16,800 mm diam. Overall length of casting machine with ladle 27,000 mm.
- 2 Furnaces for drying stopper rods. Per furnace 27 stopper rods can be dried at the same time. The furnaces are gas-fired.
- 4 Complete gas producers, 11 ft. inside diameter, type "Morgan", complete with automatic feed drum with drive, dust-catchers and coal bins, but without crane.

SPARE PARTS

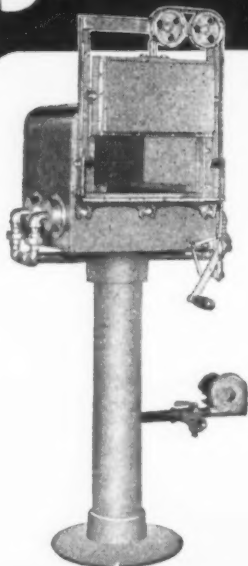
WE FURTHER OFFER:

- 4 Gas producers, rotating grate, type Widekind, adapted to gasifying coal or coke, dimensions 20-40 mm, provided with water jacket for exciting low pressure steam. Surface of each grate 5.3 m².

Everything is in good condition and, after notice, can be inspected at our works. A complete set of drawings of each part can be supplied.

ROYAL NETHERLANDS BLAST FURNACES AND STEELWORKS IJMUIDEN, NETHERLANDS

SAVE HOURS CUT COSTS



TURN THE HEAT ON TOOLS AND DIES With Quick-Acting JOHNSON Furnaces

Save time, save gas...heat treat carbon and high speed steel tools and dies with JOHNSON No. 130A. Two sizes offer wide temperature range. Powerful burners provide fast, uniform heat with time saving speed. Temperatures are easily controlled with accuracy. The counter-balanced door opens upwards. Firebox 7" x 13" x 16 1/2". Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower. Write for Complete Catalog. Johnson Gas Appliance Company, 598 F Avenue N.W., Cedar Rapids, Iowa.

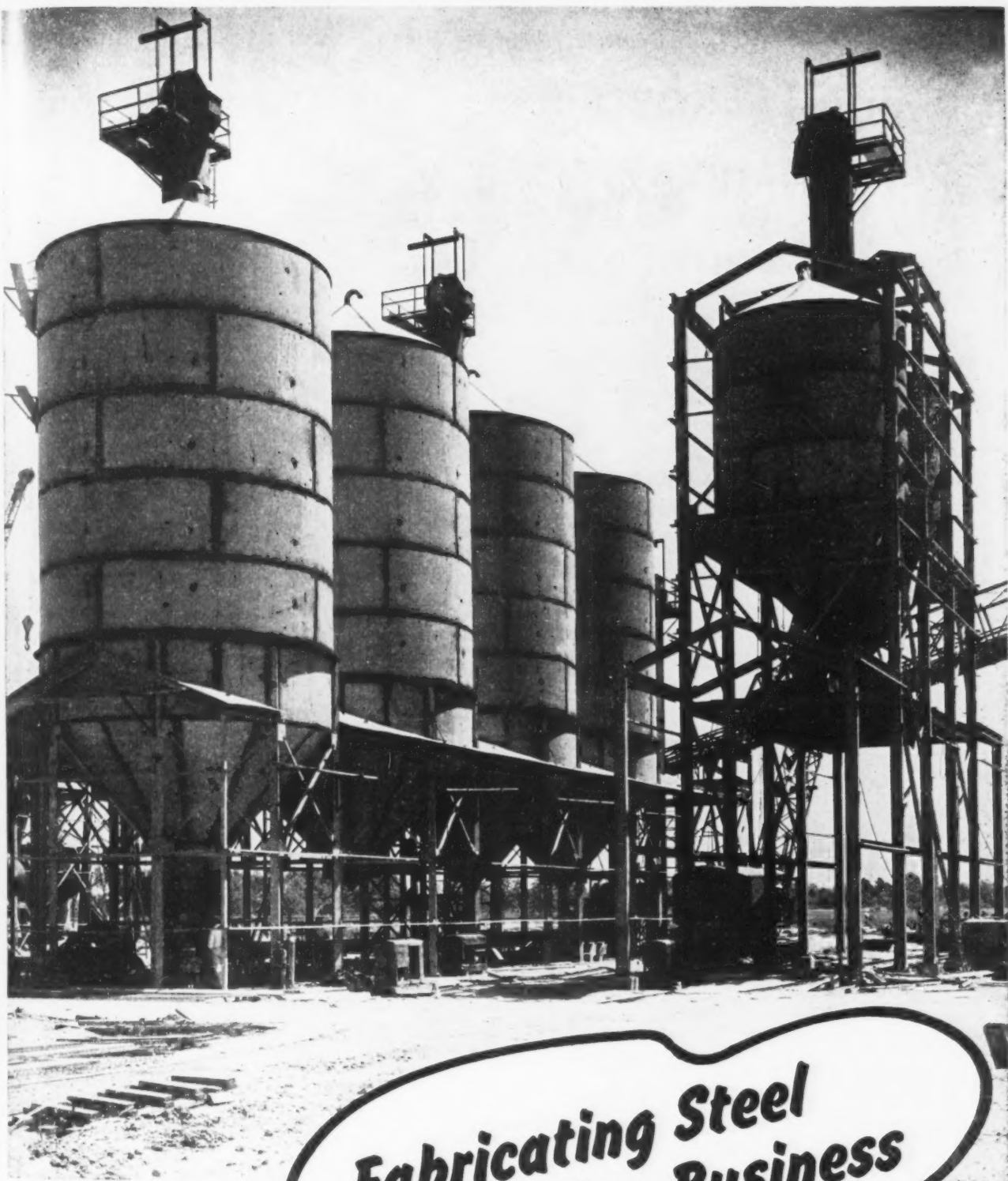
JOHNSON No. 130A Hi-Speed
For temperatures 1400° to 2350° F. \$295.00
For temperatures 1800° to 2400° F. \$325.00
F.O.B. Factory

Models also available in smaller firebox sizes.

JOHNSON

Since 1901

FURNACES FOR INDUSTRY



**Fabricating Steel
is Our Business**

Storage bins at Calvert City, Kentucky for the
National Carbide Company, Inc. . . . United Engi-
neers & Constructors, Inc., designers and builders.

THE INGALLS

IRON WORKS COMPANY

BIRMINGHAM, ALABAMA

Sales Offices: New York, Chicago, Pittsburgh

Plants: Birmingham, Ala., Verona, Pa., North Birmingham, Ala., Pascagoula, Miss., Decatur, Ala.

October 9, 1952

419

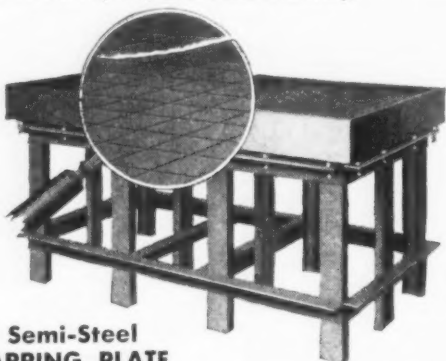
CHALLENGE *Precision* SURFACE PLATES *and Equipment*

ON EXHIBIT AT BOOTH 932

NATIONAL METAL EXPOSITION
PHILADELPHIA — OCTOBER 20-24

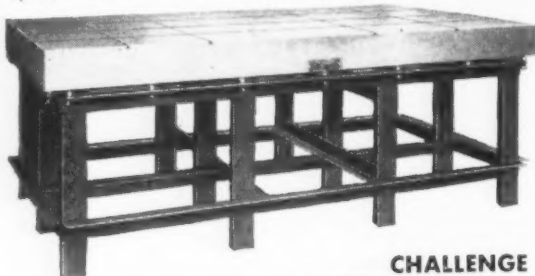


Available either precision ground or planer finished, Challenge Layout Surface Plates offer a perfectly smooth, square surface for layout, inspection or assembly line operations. Sizes range from 12" x 18" to 54" x 144". All are built of special analysis semi-steel. The all-steel stand is arc-welded to furnish the rigidity of a one-piece unit. Special leveling screws enable the user to level the plate quickly and to lock it securely.



**Semi-Steel
LAPPING PLATE**

For Accurate Lapping of Delicate Joints. Assures perfect fit when lapping metal-to-metal joints on which no sealer is used. Ideally suited for use on parts which must be lapped perfectly to avoid oil leaks. Plates have $\frac{1}{16}$ " grooves $\frac{1}{2}$ " apart.



**CHALLENGE
semi-steel WELDING TABLE**

The Challenge Welding Table illustrated above provides a true, rigid surface with Tee-Slots to facilitate assembling, locating and welding. It is built of fine grain special analysis semi-steel in three standard sizes: 30 x 60", 48 x 96", and 54 x 144"; other sizes to order. 682

THE CHALLENGE MACHINERY COMPANY

Office, Factories
and Show Room ...

Grand Haven
Michigan



To Your SPECIFICATIONS COLD ROLLED STRIP STEEL by GRIFFIN

For the last half century, Griffin cold rolled strip steel has been used profitably by hundreds of manufacturers. They have found that they can rely on Griffin to fill their specifications to gauge, temper, size, finish, length, and edges.

Consult with us on your next cold rolled steel requirements.

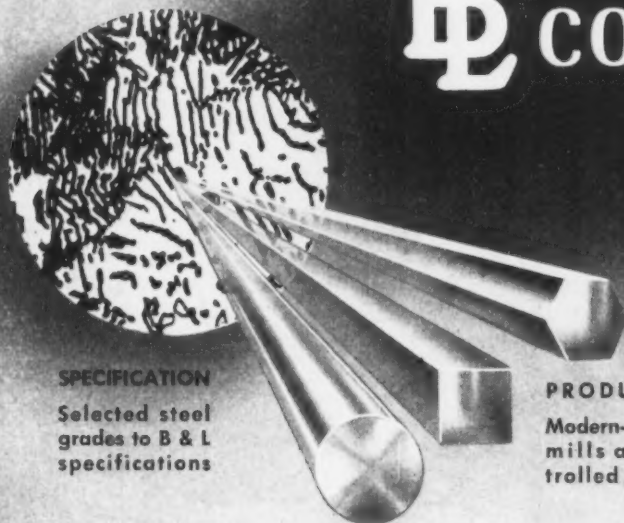
CHARLES L. LEWIS
1355 Market St., San Francisco 3, Cal.
W. H. LEONORI & CO., INC.
30 Howard St., New York 13, N. Y.
J. J. LAMBERT
323 Huntington Ave., Buffalo, N. Y.

CENTRAL STEEL & WIRE COMPANY
13400 North Mt. Elliott 3000 West 51st St. Box 148 Annex Station
Detroit 12, Mich. Chicago 80, Ill. Cincinnati 14, Ohio

GRIFFIN
Manufacturing Company
ERIE, PENNSYLVANIA

How **MACHINABILITY-PLUS**

B *is developed in* **COLD FINISHED** **BAR STEELS**



SPECIFICATION
Selected steel
grades to B & L
specifications

PRODUCTION
Modern-equipped
mills and con-
trolled methods



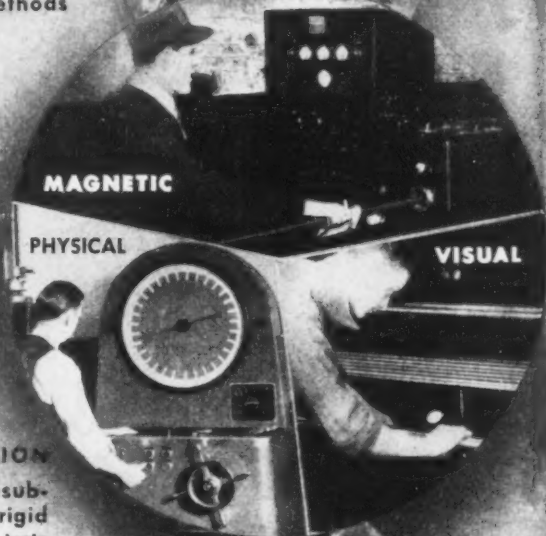
The production of B&L Free-Machining Steels is a quality-controlled operation, based on the know-how gained in three-score years of fine craftsmanship.

It is the sum total of selected steel bars and modern cold finishing processes that advances the machinability to new values which are rigidly maintained by B&L inspection standards.

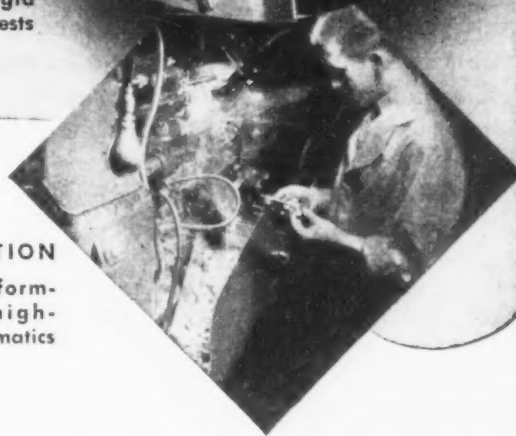
These plus-machining qualities of B&L Cold Finished Bars will pay-off on your production line . . . specify them for extra output and low unit cost in parts fabrication.

*Refer your machining problems
to B&L engineers for selection
of steel grades to fit your job.*

SCRAP is vitally needed for Defense Steel . . .
be sure your **SCRAP** goes back to the mills.



INSPECTION
Products sub-
jected to rigid
inspection tests



APPLICATION
Better perform-
ance on high-
speed automatics

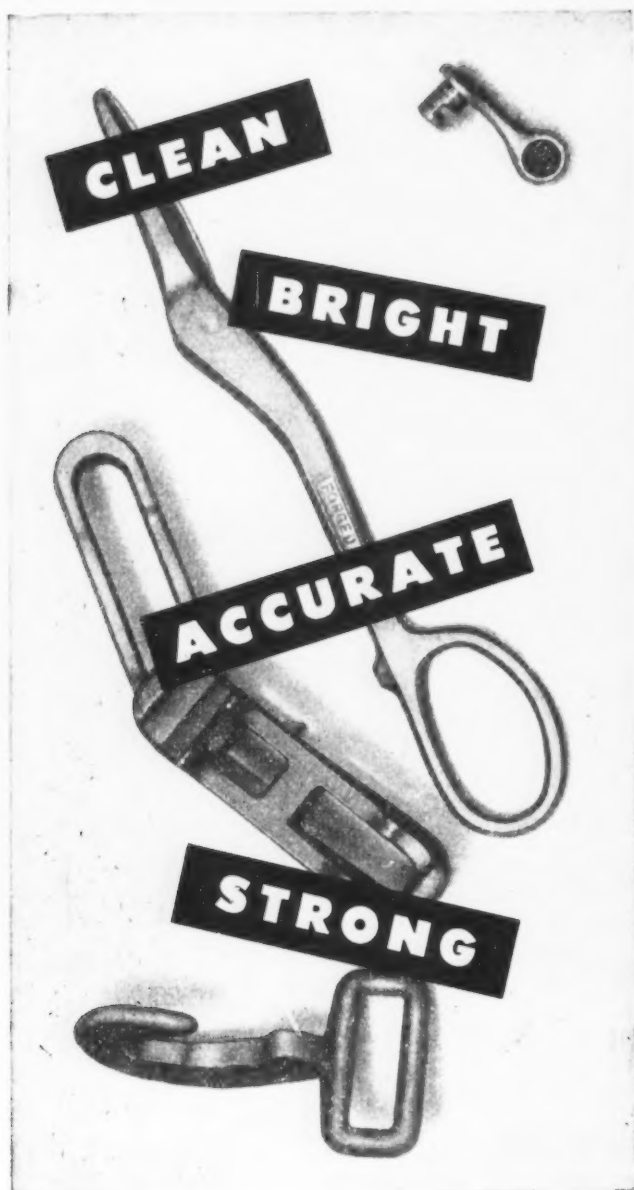
BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

PLANTS: HARVEY, ILL. • BUFFALO, N. Y. • MANSFIELD, MASS.

SALES OFFICES IN ALL PRINCIPAL CITIES



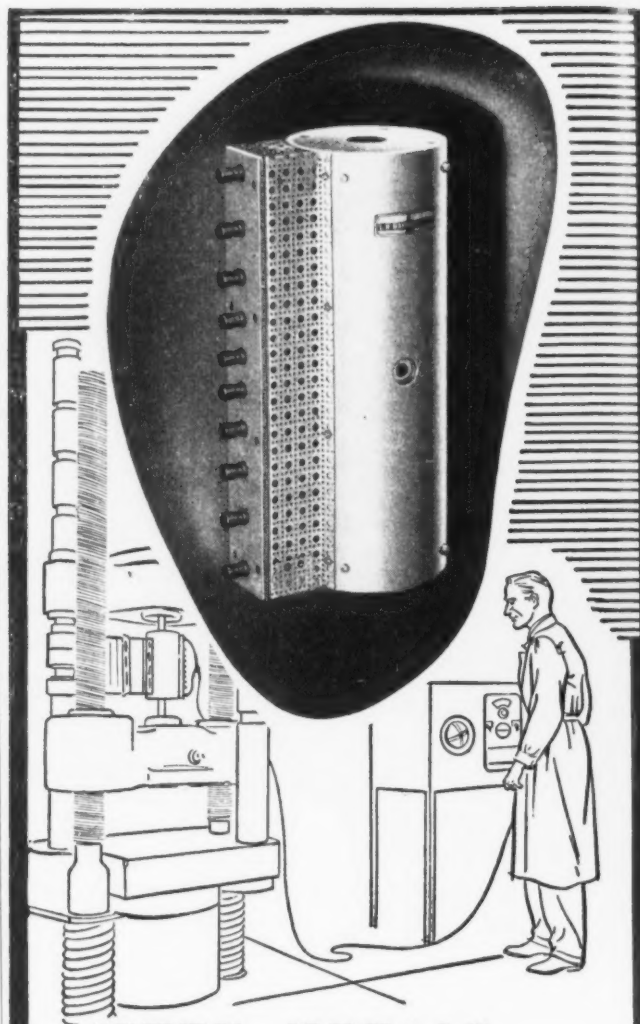


It's wise to specify Ritco Bright Finish Drop Forgings when accurate parts of topmost strength are required. These forgings are produced to your blueprint in steel or non-ferrous metals, in weights from ¼ lb. to 15 lbs. They're smooth and flash-free, require a minimum of machining before assembly into your product.

Remember RITCO for drop forgings, special fasteners, and regular and heavy head finished body bolts. We also offer complete facilities for finishing — machining and grinding. Estimates gladly submitted. Rhode Island Tool Company, 148 West River Street, Providence 1, Rhode Island.

RITCO **DROP FORGINGS**
Exclusive New England Representatives
for Cleveland Cap Screws.

SERVING AMERICAN INDUSTRY SINCE 1834



WHEN METALS MUST BE TORTURED!

In tensile, creep and stress-rupture tests of metals at high temperatures, a furnace maintaining uniform heat distribution is essential to correct fact-finding. This feature is outstanding in Marshall furnaces.

Marshall furnaces are designed for localized control of heating chamber temperature. The use of shunts between its binding posts permit modifying the temperature of heating chamber zone by zone!

Marshall Control Panels are also approved equipment in this type of metal testing. Send for literature.

MARSHALL PRODUCTS CO.
270 W. LANE AVE., COLUMBUS 2, OHIO

Marshall
FURNACES — CONTROL PANELS

You can't stop a bullet with a catcher's mitt



You can't stop corrosion with ordinary paints ...
it takes BITUMASTIC COATINGS!

CORROSION can't be stopped by ordinary paints or conventional protective coatings. They can't protect surfaces against the ravages of rust for any appreciable length of time.

But Bitumastic Coatings can!

BECAUSE the six Bitumastic® Protective Coatings, unlike maintenance paints, are specially formulated from a coal-tar pitch base* that is, for all practical purposes, impervious to water. And when you keep moisture away from an exposed surface, you *stop* corrosion.

BECAUSE Bitumastic Coatings provide an extra-tough, extra-thick barrier against corrosive elements—a barrier that is impenetrable.

BECAUSE Bitumastic Coatings provide up to 8 times the film thickness of conventional paint coatings.

BECAUSE Bitumastic Coatings stop corrosion caused by moisture—acid fumes—alkaline fumes—corrosive soil—salt air—heat.

There are 6 Koppers Coatings—formulated to control corrosion of metal and deterioration of concrete. Use the coupon for full information.

*Hi-Heat Gray contains heat-resistant metallic base.

—SEND FOR SET OF FREE BOOKLETS!—

Koppers Company, Inc.
 Tar Products Division
 Dept. 1052-T, Pittsburgh 19, Pa.

Please send me, without charge or obligation, your booklets on corrosion prevention.

Name.....

Address.....

City.....Zone.....State.....

KOPPERS

BITUMASTIC PROTECTIVE COATINGS

REG. U.S. PAT. OFF.

**SOLD THROUGH
 INDUSTRIAL
 DISTRIBUTORS**

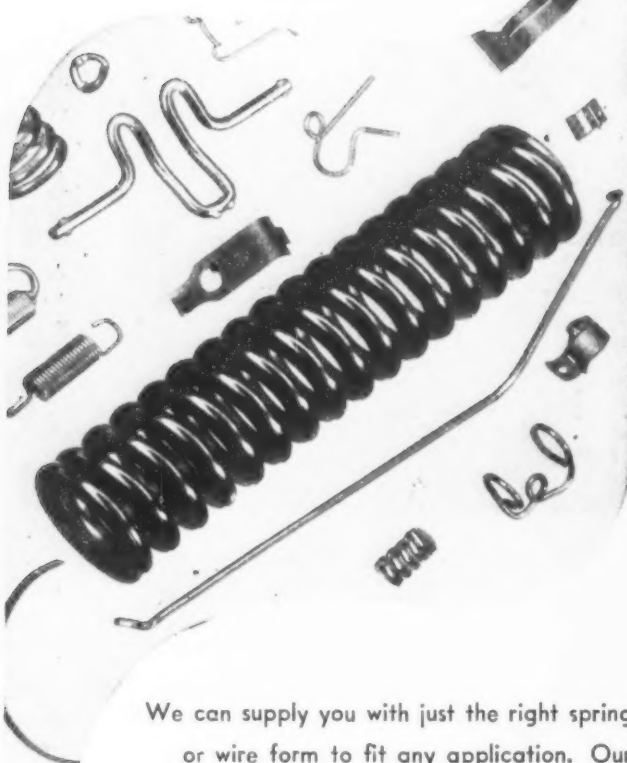
KOPPERS COMPANY, INC., Tar Products Division, Dept. 1052-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

October 9, 1952

423

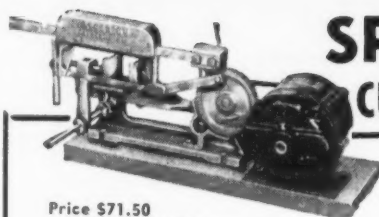
Coil Spring says:



We can supply you with just the right spring or wire form to fit any application. Our ability to deliver exactly to specifications has been proven on every type of spring job. Our efforts to please our customers is well known throughout industry. Why not let us quote on your next job today?

No order too large or too small!

The U.S. STEEL WIRE SPRING Co.
7800 FINNEY AVE. • MICHIGAN 1-6315
CLEVELAND 5, OHIO



Price \$71.50
complete w/ motor
F.O.B. Factory

SPEED UP CUTTING JOBS

with the
JEFFERSON "601"
Power HACK SAW

Cut iron, steel, brass, aluminum and all metals with the fast little Jefferson "601". Readily set up. Operates economically. Capacity up to 3 1/2" x 3 1/2". Write for free bulletin and learn how you can speed up cutting jobs and reduce costs with the Jefferson "601".

Visit us at . . .
Booth #1467
National Metal Show
Oct. 20th to 24th
Philadelphia, Pa.



Write for
free **KELLER**
Saw Catalog

Sales Service Machine Tool Co.

PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS
2353 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA



REPLACE INFLAMMABLE SOLVENTS

With Rustproof

Odorless

Instant Wetting . . .

IMMUNOL

- Non-inflammable, odorless, non-toxic IMMUNOL added to any water in long dilutions makes a powerful solvent, rust preventive and wetting agent for most cleaning and rust-proofing operations. IMMUNOL solutions replace such solvents as Stoddard Solvent, Kerosene, Gasoline, Carbon Tetrachloride, Mineral Spirits, etc. and are lower in cost as finished solutions.
- Lighted cigarettes, sparks, open flames, open electrical circuits, etc. will not ignite IMMUNOL. Your employees can work in close contact with odorless IMMUNOL without toxic effects and can immerse their hands and arms in its solutions for indefinite periods of time without fear of skin infection, degreasing or irritation.
- Parts needing rust protection are protected by a non-oily, invisible water soluble film which need not be removed prior to additional processing and can be painted or lacquered over without removal. Outstanding for replacing inflammable solvents for use on metal, plastics, glass, ceramics, woodwork, linoleum, etc.



SEND FOR FREE BOOKLET

Haas MILLER Corp.
4th & BRISTOL STS. • PHILA. 40, PA.

OLSON

MANUFACTURING COMPANY

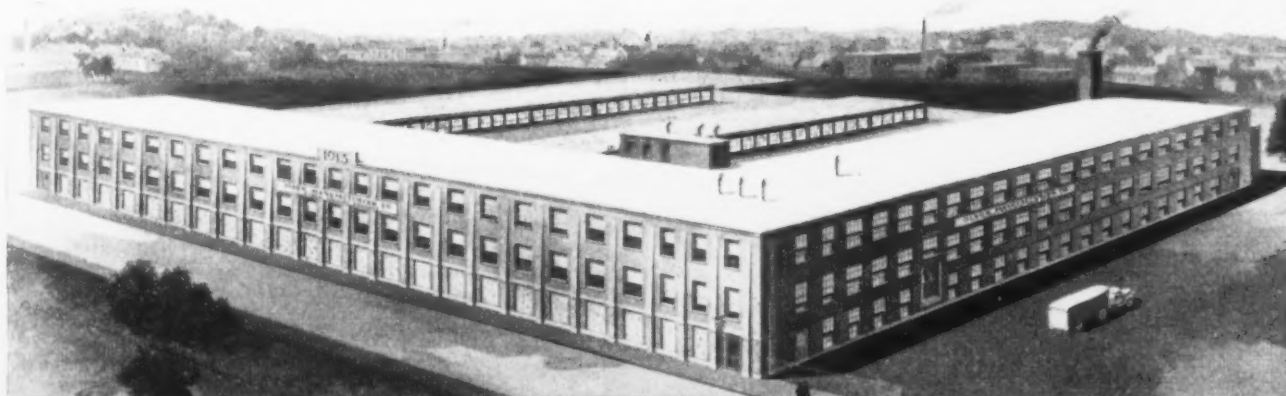
100 PRESCOTT ST., WORCESTER 5, MASS.

Representatives: New York • Philadelphia

Screw Machine Products since 1913

1/8" to 2 5/8" CAPACITY

STEEL • BRASS • ALUMINUM



QUALITY DEPENDABILITY EXPERIENCE

SUPERSTRONG-

A Perfect Answer to
ALL of Your Shipping Needs

The SUPERSTRONG line is a complete line. No matter what type of product you wish to ship, there is a SUPER-STRONG container that can do the job for you.



WIREBOUND BOXES AND CRATES

Veneer or resawn material bound with steel wire, giving adequate protection with lighter container weight.

FRUIT AND VEGETABLE CRATES

All types of wirebound and wooden boxes and crates for fruits and vegetables.

WOODEN BOXES AND CRATES

Recommended for export handling and unusual shipping conditions requiring maximum protection.

PALLETS

Hardwood pallets, reusable and expendable types.

CORRUGATED BOXES

All types of corrugated fiber containers.

WOODEN BEVERAGE CASES

Greater protection at lowest per trip cost

STARCH TRAYS

Starch, enrober and dipping trays.



RATHBORNE, HAIR and RIDGWAY BOX CO.

1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS



That's a **RUSS**

Low Frequency Furnace

for Melting, Superheating and Refining of Cast Iron. The Ideal Equipment for the Production of Nodular Iron.

Tapping weight: 6500 lbs.

Low Frequency Melting and Ladling Furnaces. Resistance heated Melting and Heat Treatment Furnaces. Over 30 years throughout all countries.



RUSS-ELEKTROOFEN KG • KÖLN

American Branch: Russ Electric Furnace Co.
Room 759-760, 1775 Broadway, New York City 19, N. Y.

ZIV'S WIZARD TOOL

UNBREAKABLE TO THE MAXIMUM



Ziv's WIZARD Tool Steel Roll-Die Set operates in the open, in all kinds of weather, at the St. Louis Shipbuilding and Steel Co., largest inland shipbuilding company in the world. Hot rolled steel channels and sheet stock are serrated in lengths up to 60 ft. To date these tools have chewed through approximately 564 miles of stock or roughly from Cleveland to St. Louis with plenty of mileage left.



High Grade
Tool Steel

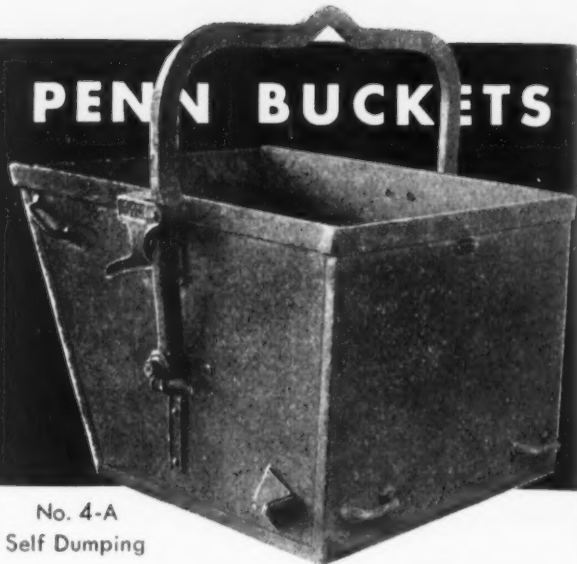


2945 W. HARRISON STREET, CHICAGO 12, ILL.

BRANCHES

DETROIT, MICH. • ST. LOUIS, MO. • MILWAUKEE, WIS.
INDIANAPOLIS, IND. • TOLEDO, OHIO • EAGLE RIVER, MICH.

PENN BUCKETS



No. 4-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.



WRITE TODAY FOR NEW BULLETIN
DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS, INC.
READING, PENNA.



industrial

and

ornamental perforations



steel available
from Accurate's stock

Accurate's wide selection of perforating dies for every purpose...long-range savings through speedy low-cost service, plus quality...assures you of top value. Engineering consultation service yours for the asking. For help in choosing the proper dies and specifications for your needs see Accurate's catalog. Send for your FREE copy today!

SERVING THESE INDUSTRIES:

AIRCRAFT • AUTOMOTIVE • BUILDING CONSTRUCTION • COMMUNICATIONS • ELECTRICAL EQUIPMENT • FOOD PROCESSING • HEATING • MINING • RADIO AND RADAR • RAILROADS • SHIP BUILDING • STEEL • LAUNDRY EQUIPMENT • VENTILATING

IN THESE MATERIALS:

ALUMINUM • BRASS • BRONZE • COPPER • LEAD • MONEL METAL • STEEL • STAINLESS STEEL • MASONITE • PLYWOOD • PAPER • CLOTH

ACCURATE

perforating company

1101 S. KEDZIE AVENUE • CHICAGO 12, ILLINOIS

CAD

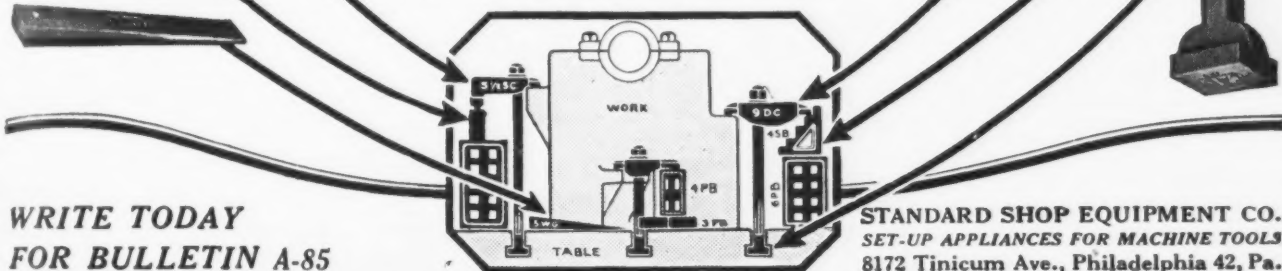
FOR
MACHINE TOOLS

Standardized set-up appliances

Why Force Your Men to waste time on machine tool set-ups when CAD Standardized Appliances will convert this non-productive time into productive labor? Why Ruin Machine Table Slots with ordinary bolts when CAD Bolts are designed to fit T Slots? The CAD Bolt is a standard machine table bolt, made of steel with full smooth threads, ready for use when you receive it.

CARRIED IN STOCK BY

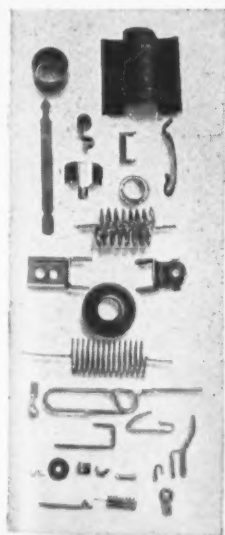
BOSTON, Chase, Parker & Co. • NEW YORK, Neal & Brinker • PHILADELPHIA, Maddock & Co. • BUFFALO, Beals, McCarthy & Rogers
CLEVELAND, Cleveland Tool & Sup. Co. • DETROIT, Strelinger Co.
CINCINNATI, E. A. Kinsey Co. • CHICAGO, Hibbard, Spencer
& Bartlett Co. • DALLAS, Briggs-Weaver Machinery Co.
SAN FRANCISCO, C. W. Marwedel • LOS ANGELES,
Almquist Bros. & Viets • SEATTLE, C. M. Lovested & Co.
IN CANADA, Canadian Fairbanks-Morse Co.



WRITE TODAY
FOR BULLETIN A-85

STANDARD SHOP EQUIPMENT CO.
SET-UP APPLIANCES FOR MACHINE TOOLS
8172 Tinicum Ave., Philadelphia 42, Pa.

Priced Right! WIRE FORMS & Metal Stampings



High-speed, quality production with custom-made precision. Wire formed to any shape for every need.

IMMEDIATE CAPACITY FOR DEFENSE SUB-CONTRACTS

STRAIGHTENING & CUTTING

Perfect straight lengths to 12 ft.

.0015 to .125 diameter

WIRE FORMS

.0015 to .080 diameter

SMALL METAL STAMPINGS

.0025 to .035 thickness

.062 to 3 inches wide

Specializing in Production of Parts
for Electronic and Cathode Ray Tubes

Write for illustrated folder.
Send Blueprints or Samples
for Estimate.

**ART WIRE and STAMPING
COMPANY**
2 BOYDEN PLACE
NEWARK 2, N. J.

SPRINGFIELD PATTERN WORKS, INC.

124 SWITZER AVENUE

SPRINGFIELD 9, MASS.

Telephone: 9-3788

WOOD AND METAL PATTERNS

COPE & DRAG PLATES

DRIER EQUIPMENT

MANUFACTURERS OF

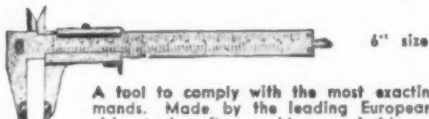
PRESSURE-CAST MATCHPLATES

Our matchplates are known for accuracy and require a minimum of cleaning. Give us a try and judge for yourself. Quotations furnished upon request.



PRECISION VERNIER CALIPERS

Accurate Dependable



A tool to comply with the most exacting demands. Made by the leading European precision tool craftsmen. Measures inside, outside, thread and depth.

The following models have the famous M-Z-B cam lock which guarantees fixed and never shifting setting when pressure on lock is released.

#30-61 Chrome Steel	.001" & 1/128"	\$14.00
#30-64 Chrome Steel	.001" & 1/20 mm	\$14.00
#30-62 Stainless Steel	.001" & 1/128"	\$16.50
#30-65 Stainless Steel	.001" & 1/20 mm	\$16.50

With set screw

#30-78 Chrome Steel	.001" & 1/20 mm	\$9.75
---------------------	-----------------	--------

Total length of above models 8". Scale 6"

12" Callipers and Height Gauges also available
Leather cases supplied free of charge with each calliper



MICROMETERS

M-Z-B Micrometers 1" size to read .0001" with hardened threads, stop-nut and ratchet comparable to the best only \$15.00. Made by the men who made precision tools famous with the "know-how" and experience that produced hundreds of thousands of the finest callipers and micrometers ever sold.

Send for our latest literature giving detailed information on these precision tools.

We also import fine precision pliers—send for information

INTER-CONTINENTAL TRADING CORP. 90 WEST STREET NEW YORK 6, N.Y.

WORK ROTATOR

MANUFACTURERS
ASSEMBLERS
WELDERS

WORK ALIGNER



- Saves Time
- Saves Money
- Increases Production

The new JOHNSON ROTARY WORK ALIGNER is a valuable time and money saver in all work requiring rotation and alignment of stock. Speeds production in repair, welding, manufacturing and assembling departments by eliminating slow expensive set-ups on many miscellaneous jobs.

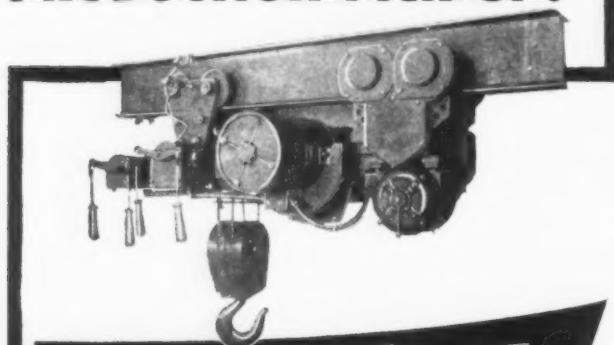
Proves alignment or run-out accurately on circular work from O D surfaces, without need of centers.

A precision built tool of the finest materials and workmanship. Portable. Easy and simple to operate. Rugged construction to withstand long hard use. Available in four models and sizes. Write today for descriptions and prices to JOHNSON ROTARY WORK ALIGNER.

JOHNSON MACHINE WORKS

619 MENOMONIE STREET
EAU CLAIRE, WISCONSIN

PRODUCTION PICK-UP:



ELECTROLIFT

worm drive hoist

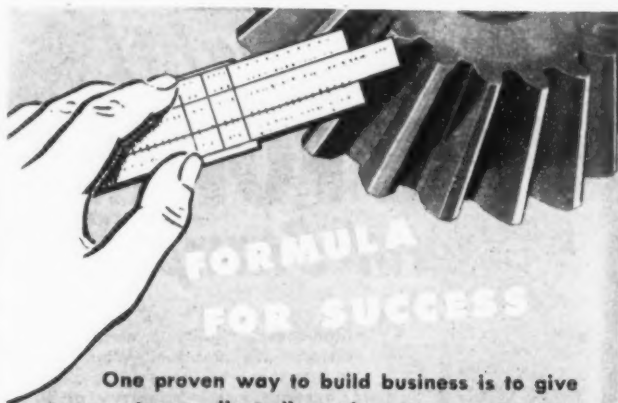
Watch your production pick up with these time-saving, manpower-saving hoists. You can move materials faster, smoother, quieter with ElectroLift.

Wide variety of one-man models, for safe movement of loads up to 6 tons. Available with push-button control for pin-point accuracy.

For further features write for Bulletin 36, or consult your ElectroLift representative listed in telephone directory.



ELECTROLIFT, INC., 30 CHURCH ST., NEW YORK 7, N. Y.



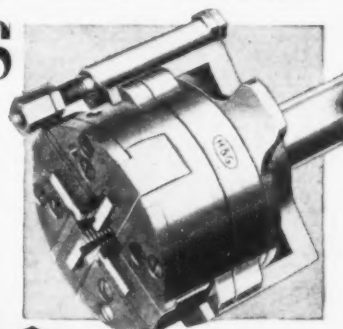
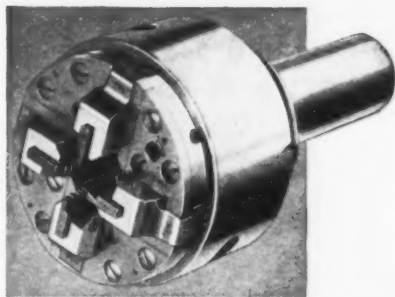
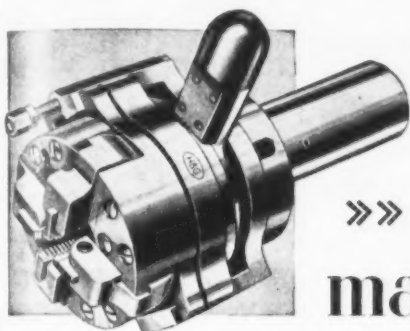
One proven way to build business is to give customers "extra" service at no extra cost. In ours, the gear business, for example, meeting the customer's requirements entails more than just filling his specifications. We're not satisfied until we've met all our own rigid standards of quality and dependability—no matter how much time and work is involved.

This added effort for each and every customer, we find, helps us keep our old customers and continually bring new ones into the fold. THE EARLE GEAR & MACHINE COMPANY, 4707 Stenton Ave., Philadelphia 44, Pa.



It's good business to do business with EARLE!

An IDLE man at
a BUSY automatic spells profits
»» a BUSY man at an IDLE
machine spells LOSS



H & G INSERT CHASER DIE HEADS
ARE PREFERRED BY SCREW MACHINE ENGINEERS
BECAUSE THEY SPELL . . . LESS DOWNTIME . . .
BETTER THREADS . . . LOWER COSTS

THE EASTERN MACHINE SCREW CORPORATION
21-41 Barclay Street, New Haven, Conn.

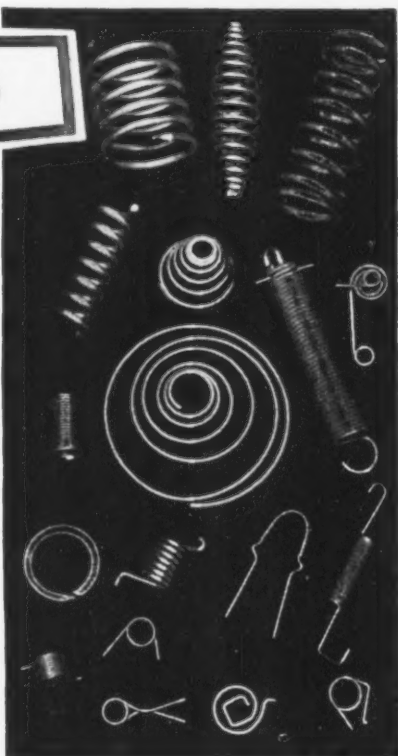


Write for
informative
literature

SPRINGS

Since 1905
Hubbard
has been
making
PARTS
LIKE
THESE

Consult us
about them



M. D. Hubbard Spring Company
301 Central Avenue • Pontiac 12, Mich.

THIS BOOK . . . will answer
all your
BRONZE
CASTING
PROBLEMS
. . . and it's
FREE



A 46-page, flat-opening,
flexible-bound Reference
Book that should be in the
hands of every Engineer
who specifies or uses

Bronzes. Due to the cost
of preparing and produc-
ing this useful book, we
can only send it to those
who request it in writing
on their business letter-
heads — and remember,
there's over 41 years "spe-
cialized experience" in cast-
ing Bronzes behind us.

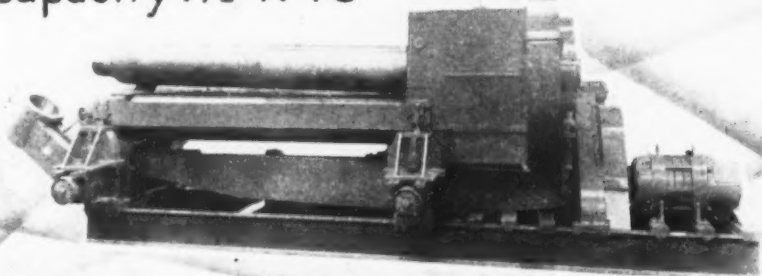
AMERICAN MANGANESE BRONZE
COMPANY

4701 Rhawn St., Holmesburg, Philadelphia 36, Pa.

Established 1909

INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity 1½" X 10'

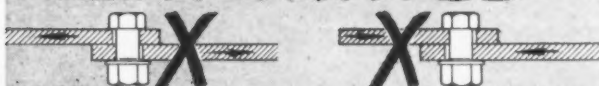


Our Line

Light and heavy machinery for all classes of sheet metal, plate and structural work

BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

SLIP-JOINT FASTENING ELIMINATED



Bolts and other non-hole filling fasteners require holes that are larger in diameter than the fasteners. While this provides for easy insertion of fasteners it also results in joints that can slip under reversal of load.



are automatically and instantaneously driven into holes of smaller diameter than the Lockbolt* shank. Result: a tight interference fit that permits No Fastener Deflection and eliminates "Slip Joints."

Every Huck Lockbolt* pulls and holds together the joint materials with thousands of pounds preload before the Lockbolt* collar is swaged to the pin. This assures a positive, non-loosening fastener that precludes failures due to torsional or twisting action.

Form 8-153

*Manufactured under U.S. patents, other patents pending.

Huck

MANUFACTURING CO.
DETROIT, MICHIGAN



*THE STROLLO

A STROLLER
FOR THE
PARTICULAR
PEDESTRIAN

HONK!
HONK!

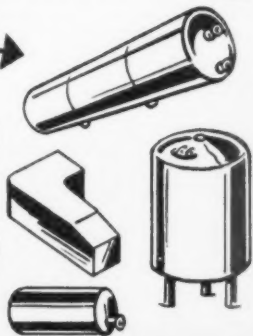
If it's made of

**PLATE
STEEL,**

*Stover
can make it!*

OTHER SAMPLES OF STOVER FABRICATION

Think of Stover in connection with your steel fabrication requirements. Stover engineers can help you with the specifications if you like, and the sheet and plate steel experts in the Stover organization will produce your fabricated article to customary Stover high quality.



STOVER STEEL TANK & MFG. CO.
FREEPORT, ILLINOIS



HIGH SPEED GRINDING WHEELS
CUT-OFF AND COPING WHEELS

GEO. H. BULLARD COMPANY, INC.

*The Specialty Manufacturing Company
in the Industry*

WESTBORO, MASSACHUSETTS

WRITE DEPT. A for CATALOGUE and PRICES

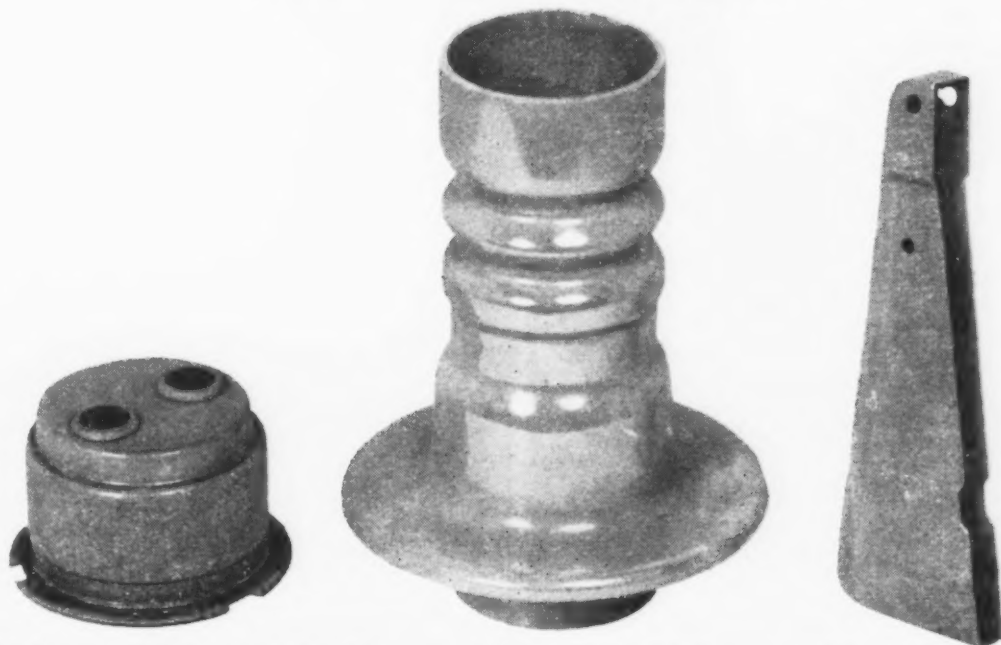
EASTERN TOOL & STAMPING CO., INC.

PRESSED METAL ENGINEERS

DIES & STAMPINGS

SAUGUS

MASSACHUSETTS



STAMPING SPECIALISTS — ALL METALS — ALL INDUSTRIES

MORE PROFITABLE

Scrap Handling



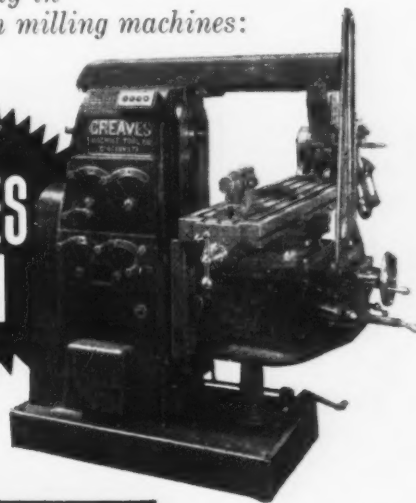
assured by

OWEN Grapples

THE OWEN BUCKET CO., 6011 Breakwater Ave., Cleveland, O.
Branches: New York, Philadelphia, Chicago, Berkeley, Calif

your best buy in
modern milling machines:

GREAVES NO.2-H



Plain or Universal

• Offers every modern milling machine advantage:

18 spindle speeds 25 to 1250 rpm,
18 feeds $\frac{1}{2}$ " to 30" per minute, rapid
traverse, Timken bearings and
many others.

You can't buy a better combination
of simplicity, rugged construction,
ease of operation, accuracy and
production speed.

Send for bulletin and price list.

GREAVES

THE GREAVES MACHINE TOOL CO.

2400 Eastern Avenue, Cincinnati 2, Ohio

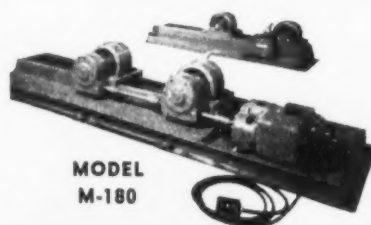
TURNING ROLLS

5 MODELS

TURNING CAPACITIES
UP TO 75 TONS

WRITE FOR
BULLETIN 81

For Hand or Automatic Welding,
Finishing Operations On Tanks
Up To 14 Ft. Diameter • Revers-
ible, Variable Speed Adjustment
• All Steel Construction



MODEL
M-180

REED

REED ENGINEERING COMPANY

1006 W. FAIRVIEW CARTHAGE, MO., U. S. A.
DESIGNERS AND MANUFACTURERS OF
MODERN METALWORKING MACHINES

REED

COWLES

GANG SLITTING KNIVES

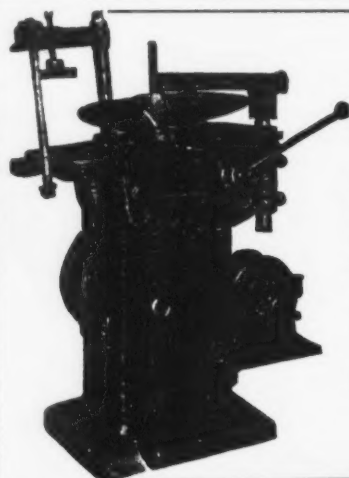
OVER 30 YEARS EXPERIENCE



Standard for Service
and Durability.
Ground to extremely
close Tolerances and
Finish. Made by
Toolmakers.

**COWLES
TOOL COMPANY**

2086 W. 110th ST. CLEVELAND 2, OHIO



"DAVIS" KEYSEATER

Low in Cost. Durable.
Easy to operate.
Table adjustable for
straight or taper keyways.
Three sizes. Keyways
1/16" up to 1".

DAVIS KEYSEATER CO.
400 Exchange St.
Rochester 8, N. Y.

GOSS and DE LEEUW

MULTIPLE SPINDLE

CHUCKING MACHINES

Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

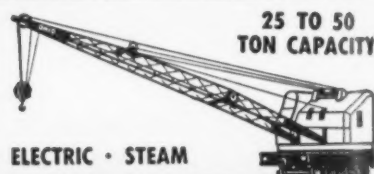
ATLANTIC STEEL PRODUCTS CO.

1330 N. 30th St., Philadelphia 21, Pa.

From Stock

BARS • STRIP • SHEETS • PLATES

OHIO LOCOMOTIVE CRANES



25 TO 50
TON CAPACITY

DIESEL • GASOLINE • ELECTRIC • STEAM

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

STAINLESS STEEL

—PERFORATED—

TO YOUR REQUIREMENTS
SEND US YOUR DRAWING FOR PRICE

PERFORATED METALS
FOR ALL INDUSTRIAL USES

ALL SIZE AND SHAPE HOLES—ALL METALS
ARCHITECTURAL GRILLES

DIAMOND MFG. CO.

BOX 28 Write for Catalog 35 WYOMING, PA.

METAL STAMPINGS • WIRE FORMS

Just a few of the more
than 7000 catalog items
we manufacture.

What do YOU need?

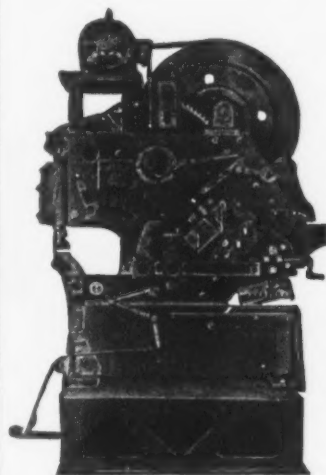
EASTERN TOOL & MFG. CO.

General Office: BELLEVILLE 9, N. A.

WEBB STEELWORKER

Combination Shear, Punch, and Coper

5 Complete Tools in a Single Unit



- 1 Punch for plate, bars or structurals.
- 2 Cuts angles and tees with straight or miter cut.
- 3 Cuts off round and square bars.
- 4 Shears plates and bars.
- 5 Coping or notching attachment.

For diversified shop work or high production output, this all-purpose machine is always in complete readiness to do any of above operations.

Write for Illustrated Literature and Prices Today.

Mfrs. of PLATE BENDING ROLLS and INDUSTRIAL WEIGHING EQUIPMENT

THE **WEBB** CORP.
WEBB CITY, MO., U. S. A.
Since 1881

zinc WIRE—STRIP, COILED
FOR ELECTRIC FUSE
ELEMENTS
EYELETS ALSO BRASS or STEEL
THE PLATT BROS. & CO., WATERBURY, CONN.

PRODUCERS
OF *Hot Rolled* ELECTRIC FURNACE
QUALITY

BARS * SMALL SHAPES * STRIP

BOIARDI STEEL
CORPORATION

300 Lower Market St. Milton, Penna.

DON'T SCRAP IT!

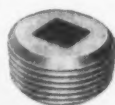
Ever have a tap or drill break in an expensive part? . . . so that even careful drilling couldn't save it? Today, parts costing as little as 50c can be economically salvaged by an Elox Electron Drill.* They're real money savers! No plant can afford to be without one. Write for particulars.

Elox Corporation of Michigan

726 N. Rochester Rd.

Clawson, Mich.

PIPE and AUTOMOTIVE PLUGS and FITTINGS



Ferrous & Non-Ferrous
PITTSBURGH PLUG
AND PRODUCTS CO.



Pittsburgh 15, Pa.

Evans City, Pa.

MAYLINE



MAYLINE 4-Post Tables

Have These Special Features

- DROP-IN STEEL HINGES
- SOLID BASSWOOD TOP
- RIGID STEEL END CLEATS
- PLATFORM TYPE FOOTREST

Also: Plan Files and Drawer Units, Auxiliary Drawer Units, Stools, Straightedges, T-Squares, Sensitized Paper Dispensers. Sold through dealers nationally. Write for details.

ENGINEERING MANUFACTURING CO.
637 North Commerce St., Sheboygan, Wisconsin



MAYLINE

Control Temperatures More Closely

REDUCE COST • SAVE TIME

This CATALOG
of
IMPROVED
PYROMETER
SUPPLIES
shows you how!



Get your **FREE COPY**
TODAY!

- ★ THERMOCOUPLES
- ★ THERMOCOUPLE WIRE
- ★ INSULATORS
- ★ PROTECTION TUBES
- ★ LEAD WIRE
- ★ TERMINAL HEADS

Please send free copy of Catalog No. 5.

Name _____ Title _____

Company _____

Street _____

City _____ State _____

ARKLAY S. RICHARDS CO., Inc.
NEWTON HIGHLANDS 61, MASS.

CONSIDER GOOD USED EQUIPMENT FIRST

BELT GRINDING UNIT

Hill Clutch & Machine & Fdy. Co. Open Side Abrasive Belt Grinding Unit, Designed to accommodate slabs up to $\frac{3}{4}$ " thick x 30" wide x 30' long.

BRAKE—LEAF TYPE

16' x $\frac{3}{4}$ " Drais & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

BUILDING

72'6" x 140' Steel Building—NEW—Designed for Corrugated Steel Siding and to carry load of 32 ton overhead electric traveling crane.

CHARGING MACHINE

6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Gasoline Engine, Rubber Tires.

CRANE

6 $\frac{1}{2}$ ton Shepard-Niles Overhead Electric Traveling Crane 80' Span, Motors 440/3/60. Equipped with 2 $\frac{1}{2}$ yd. Clamshell Bucket.

CRANE—GANTRY

5 ton Whiting Two Leg Gantry Crane 52 Ft. Span Cab Control, Three Motors 220 v. 3 ph. 60 cy.

FLANGING MACHINE

$\frac{3}{4}$ " McCabe Pneumatic Flanging Machine, Pneumatic Haldowns, Circle Flanging Attachment.

FORGING MACHINE

5" Ajax Forging Machine or Upsetter, Motor driven. Equipped with Air Clutch.

FURNACES—Melting

400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.

15 ton Herault Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.

25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

LEVELER—ROLLER

60" Aetna-Standard Roller Leveler, Motor Driven. 17 Rolls 4 $\frac{1}{2}$ " Dia.

PLANERS

48" x 48" x 20' Cincinnati, Four Head

48" x 43" x 12' Niles-Bement-Pond, Four Head

60" x 63" x 12' Niles-Bement-Pond, Four Head

72" x 72" x 12' Niles-Bement-Pond, Four Head

PLATING MACHINE

Type "B" Crown Full Automatic, Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

PRESS—KNUCKLE JOINT

1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2 $\frac{1}{2}$ " stroke, 18" Shut Height.

ROLLING MILLS

8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.

12 $\frac{1}{2}$ " x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.

18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill. Complete with Elec. Equip.

18" x 60" Three High Roughing Mill. Complete with billet heating furnace and accessory equipment including electrical equipment.

27" x 54" United Two High Skin Pass Mill

STRAIGHTENERS

No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3 $\frac{1}{2}$ " Bars or 4 $\frac{1}{2}$ " O. D. Pipe or Tubing. NEW 1950.

No. 4 Kene Roach 8-Roll Straightener Capacities 2" Rounds or Squares, 3x3 $\frac{3}{4}$ " Angles, 2 $\frac{1}{2}$ " Channels, etc.

No. 18 Sutton Round Straightener, Motor Drive. Capacity 3 $\frac{1}{2}$ " to 4 $\frac{1}{2}$ " O. D. Friction Drive complete with 1 $\frac{1}{2}$ H.P. A.C. Motor.

TESTING MACHINE

20,000 lb. Southwark-Emery Universal Hydraulic Testing Machine.

300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

TRIMMING LINE

#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys $\frac{1}{2}$ " max. Trimmed width 27" min 66" max. Scrap Length $\frac{3}{4}$ " min. 2 $\frac{1}{2}$ " max.

UNIVERSAL IRONWORKERS

Ryerson Steel Frame Universal Iron Worker. M.D. Capacity Punch $\frac{3}{4}$ " thru $\frac{5}{8}$ ", Shear 1" Square 1 $\frac{1}{4}$ " Round, $\frac{1}{2}$ " x 4" Flat, 4 x 4 x $\frac{1}{2}$ " Angles.

No. 20U-30 Buffalo Armor Plate Universal Ironworker—Combination Punch Shear & Bar Cutter. Motor Driven Capacities—Shear 3" Round, 2 $\frac{3}{4}$ " Square, 5x1 $\frac{1}{2}$ " Flat, 5x5 $\frac{3}{4}$ " Angles 12" — 31 $\frac{1}{2}$ " Beams, etc., Punch 1 $\frac{1}{2}$ " thru 1 $\frac{1}{4}$ ".

RITTERBUSH & COMPANY, INC.

50 Church Street, New York 8, N. Y.
Phone—Cort 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Midwest Market—Action in the Midwest used machine tool trade seems to be holding at last month's level, though several dealers reported a slight drop during the month.

Machine tool rebuilders were in good shape, boasting order backlogs that guaranteed work for at least several months. Deliveries of spare parts are improved, but delays on hard-to-get items are still running up to several months.

Perhaps a reflection of the dealers' dim view of their market in the near future is the recent drop in their warehouse inventories of used machine tools. Dealers are still buying and canvassing desirable equipment, but the most concentrated effort is on the selling end. Their own purchases are falling off, as they attempt to lower their stocks of used equipment.

Strongest demand in the Midwest area is for vertical mills, radial drills and grinders. Vertical mill attachments are also moving well.

New Tool Threat—Speedup of new machine tool shipments is causing considerable concern in the trade. With the market for older tools already on rubber legs, dealers fear the increased availability of new tools may weaken their position even more. It was expected that shipments of foreign tools might be cut even further for the same reason.

Diversity of opinion on foreign tools continues. Many dealers are still worried about the problem of replacement parts, but a new pattern is emerging among those who have tried selling foreign tools.

Faster From Europe—Dealers handling the foreign equipment report they have been receiving replacement parts by air express faster than they can get spare parts for domestic machines from U. S. manufacturers. In one case, delivery time on a foreign spare part was only 10 days.

Firms that have had favorable experience with foreign machine tools indicate they will continue to deal in this equipment. Stocks, however will be limited to a very few lines. Only equipment that is an excellent buy or units that can compete with domestic equivalents on a price basis, even in a much slacker market, will be carried. Small lathes and milling machines will probably be the lead items in these highly selective inventories of foreign tools.

Main problem troubling dealers handling foreign tools is the recent price markup on certain types of equipment. Some dealers are blaming these price boosts on the importers.

Heavy foreign equipment is moving rather slowly in the Midwest. Last week a buyer could purchase English, Belgian, German, Danish and Swedish equipment at dealers' showrooms.

An indication of European tool manufacturers' desire to stop the ebb of U. S. imports of machinery is their attempt to speed up shipments. One Swedish firm claimed it could ship equipment from its home plant to New York in less than 6 weeks.

New Chapter—The vigorous Machinery Dealers National Assn. is hoping to set up another chapter in Milwaukee. A meeting of the MDNA Board of Directors is planned for the middle of this month in Milwaukee and prospects of establishing a new chapter there will be discussed at that time.

Current paid membership of the MDNA is 219. Association goal is 300 members by the time of the next MDNA convention.

Price Book—Latest from association headquarters on the now yellowing price book is that it should be out sometime around the end of this month. Office of Price Stabilization has not given a definite date, but says page proofs are now okayed.

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS

12" x 12" Pennsylvania Air Compressor, 100 S.P. Pressure, Complete with 75 H.P. Syn. Motor
12" x 11" Sullivan W-3 Air Compressor 885 CFM. Driven by 150 H.P. Westinghouse Syn. Motor 440/3/60

BAR TURNING MACHINE

Medart HF-2 Bar Turning Machine, Capacity 1" to 2 1/2". Complete with Accessories

BENDING ROLLS

6" x 4" Ryerson Pyramid Type Bending Roll
20" x 1" Southwark Pyramid Type, Bending Roll
20" x 1" Southwark Pyramid Type, Motor Driven

BRACKS—LEAF TYPE

1 1/2" Dries & Krump Leaf Type Bending Brake Motor Driven with 5 H.P. A.C. Motor
12" x 3/16" Chicago #228 Steel Apron Brake, M.D.
10" x 1/2" Dries & Krump Leaf Type Bending Brake, Motor Dr. with 40 H.P. A.C. Motor

BUILDING

12'6" x 140' Steel Building—NEW—Designed for Corrugated Steel Siding—and to carry load of 30 ton overhead Electric Traveling Crane

BULLDOZER

25 Williams White Bulldozer, Motor Dr. with 50 H.P. Motor, 440 volt, 3 phase, 60 cycle. Face of Crosshead 20" x 90" Movement of Crosshead 21"

CHARGING MACHINE

8000 lb. Hrosius Floor Type Gasoline Driven Charging Machine, Equipped with Peel, Buda Gasoline Engine, Rubber Tires.

CRANES—GANTRY

5 ton Whiting Two Leg Gantry Crane 52' Span Cab Control, Motors 220 v, 3 ph. 60 cy.
15 ton P&L Two Leg Gantry Crane 45' Span With 13' Overhang one end, 10' other end and 5 ton Auxiliary. Two Trolleys and 5 Motors. 440 volt 3 phase 60 cycle

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Hobbs Crane 28'6" Span 220/3/60 AC
6 1/2 ton Shepard-Niles 80' Span 440/3/60 AC With 2 1/2 yd. Clamshell Bucket
10 ton Shaw 67' Span 230 Volt D.C.
10 ton P & H 40' Span 440/3/60 AC
10 ton Erie 60' Span 440/3/60 AC
15 ton Niles 60' Span 230 Volt D.C.
15 ton Toledo 46' Span 220/3/60
20 ton Bedford 50' Span 220/3/60 AC
20 ton Morgan 68' Span 230 Volt DC With 5 ton Auxiliary

DIEING MACHINES

75 ton Henry & Wright High Speed Dieing Machine Double Roll Feed, Scrap Cutter, 3" Stroke
100 ton Henry & Wright Dieing Machine 4" Stroke, 18" Shut Height, Complete Elec. Equip.

DIE CASTING MACHINES

Model BA-12 KUX Die Casting Machine, Air operated. Plunger Goose-neck Type for zinc, lead & tin. Die space between 12 1/4" x 12 1/4". Die Reparatres 8" NEW 1949, never used
Frank & Whitney Type HL-2416 Single Spindle 3-Dimensional Keller Machine, with complete electrical equipment and accessories

FLANGING MACHINE

McAfee Pneumatic Flanging Machine, Pneumatic Hold-downs, Circle Flanging Attachment

FORGING MACHINES

4" National
1 1/2", 2", 3", 4", 5", Ajax
1", 2", 3", 5", Acme
5 Ajax—Air Clutch

FURNACES—HEATING

66 KW Leeds & Northrup Home Furnace #9478-UB-28, With controls. Work space 28" dia. x 28" deep

FURNACES—MELTING

400 lb. Moore Type "UT" Melting Furnace, Top Charge, Complete with Transformer, New 1943—Little Used
15 ton Heroult Model V-12 Top Charge Hydraulically Operated, Complete with Transformer Equip.
35 ton Moore Size "NY" Melting Furnace With 7500 KVA Transformer 12,400/3/60

GEAR REDUCERS

500 H.P. United Combination Reduction Gear & Pinion Stand, Gear Ratio 8.581:1
600 H.P. Farrel Birmingham, Size 18 Reduction Gear, Ratio 720 to 244 RPM
700 H.P. Falk Single Reduction Gear, Ratio 875 to 200 RPM
1800 H.P. Mesta Gear Reduction Unit, Ratio 19:1

GRINDER

No. 4 Cincinnati Centerless Grinder, Motor Driven, Capacity standard work rest 2" to 6" dia., optional work rest 1/2" to 3". Special fixtures will allow work to be handled up to 9" dia.

GRINDER—CYLINDRICAL

14 x 36" Norton Type C, Complete with Elec. Equip.

HAMMERS—BOARD DROP

1200, 1600, 4000 lb. Model J2 Chambersburg

HAMMERS—STEAM DROP

1000 lb. Billings & Spencer

HAMMERS—STEAM FORGING

1200 lb. Massillon Single Frame
1600, 1800, 2000, 3000, 4000 lb. Chambersburg
600, 1500, 2500 lb. N.B.P.
600, 1100, 1500, 2000, 2500, 3500, 4000 S. Erie
20,000 lb. Massey Steam Forging Hammer

HAMMERS—MISCELLANEOUS

No. 6N Nazel Hammer, Geared Motor Drive
200 lb. Bradley Compact Hammer, Arr. for Motor Drive with 10 H.P. A.C. Motor

WE OFFER A COMPLETE LIQUIDATION SERVICE ON ANY BASIS WHICH CIRCUMSTANCES INDICATE WOULD BE MOST BENEFICIAL, WHETHER BY AUCTION, PRIVATE LIQUIDATION OR OUTRIGHT SALE

CONSULTANTS IN MANUFACTURING PROBLEMS FOR OVER A QUARTER OF A CENTURY

THERE IS NO SUBSTITUTE FOR EXPERIENCE

CONTACT US IN CONFIDENCE WITHOUT COST OR OBLIGATION

2000 lb. Chambersburg Pneumatic Hammer Complete with Elec. Equip. New 1951

15" x 12" Chambersburg Cocostamp Hammer, 18" stroke

LATHE—TURRET

Model 21, Gisholt Geared Head Turret Lathe, Spindle Bore 4-1/16", Elec. Equipment and numerous accessories incl. NEW 1951

LEVELERS—ROLLER

38" McKay 17 Roll Leveler, 5 1/4" Dia. Rolls Helled Motor Drive

60" Aetna Standard 17-Roll Leveler, 4 1/4" Dia. Rolls Motor Drive

MOTORS

12-0 H.P. Westinghouse Induction Motor 6600 volt 3 phase 60 cycle 593 R.P.M.
2000 H.P. General Elec. Induction Motor 6600 volt 3 phase 60 cycle 800 R.P.M.
2500 H.P. General Elec. Direct Current Motor 6600 volt 175/350 R.P.M.

MOTOR GENERATOR SET

740 H.P. General Electric Syn. Motor 4400 volt A.C. with two generators 750 KVA 230 volt D.C., Complete with Panel Board, etc.

NAIL MAKING MACHINES

No. 1 1/2 National—Sizes 10D, 12D, 16D, 20D, 30D
No. 3 National—Size 6D
No. 2 Glader—Sizes 6D, 7D, 8D, 9D
Angell—Sizes 10D, 12D, 16D, roofing

PLANNER—PLATE EDGE

30" x 1 1/4" Southwark Plate Edge Planer, Motor Driven, Equipped with 16 Pneumatic Jacks

PRESSES—HYDRAULIC

No. 200 Milwaukee Brinqueting Press, Complete with Pump, Piston Load 118 tons, Hydraulic Operating Pressure 2100 lbs. psi.

75 ton Williams White Straightening Press, 27" Stroke, Bed 8" x 16" 6 1/4" Dia. Kam

260 ton Bilas Hydrodynamic 48" Stroke Bed Area 24" x 21" Hyd. Pump Incl.

500 ton Southwark Hydraulic 24" Stroke, 78" Daylight Platen 64" R to L x 32" F to B

500 ton Southwark Open Throat Hydraulic Press 12" Stroke Platen 56" x 56"

700 ton Elmes Forming Press, 27" Stroke, 30" Dia. Ham. Platen 46" x 88" with overhang 40" x 129"

Complete with Pump & Motor

PRESS—HYDRAULIC WHEEL

100 ton Elmes Inclined Hydr. Wheel Press 72" Between Parallel Bars, Complete with Pump & Motor

PRESS—KNUCKLE JOINT

25 Bilas Knuckle Joint Embossing & Coining Press

Friction Clutch 18" Stroke, 18" Shut Height

PRESSES—STRAIGHT SIDE

No. 87A Bilas 250 Ton Capacity, Double Geared 32" Stroke, 30" x 33" Bed Area, Air Cushion

No. 305 Bilas 9" Stroke 14" Shut Height Equipped with Marquette Air Cushion

No. 59 Toledo Double Geared Tie Rod Press 255 ton Friction Clutch 18" Stroke 56 1/4" x 85" Bed Area

No. 3 Ferracute Super Speed Punch Press 30 ton Capacity, NEW 1946—never used

No. 675B Bilas Single Geared 1 1/2" Stroke, Double Roll Feed & Chopper, 10 H.P. A.C. Motor

No. 620 Bilas High Production Press, 1 1/2" Stroke 81-40 Verson 200 ton Press, 30" Stroke Bed Area 40" x 44"

No. 13 Zeh & Hahnenmann Patent Percussion Press 150 ton 12" Stroke, 17" x 17" Bed Area

No. 10-E Bilas 800 Ton, 10" Stroke Bed Area 60" x 120"

No. 7 Bilas 400 Ton 8" Stroke Bed Area 48" x 108"

No. 1037-5/8 Hamilton 300 Ton 16" Stroke Bed Area 48" x 104"

No. 93 1/4 Toledo 175 Ton, 6" Stroke Bed Area 40" x 72"

No. 606 1/4 Hamilton 165 Ton, 12" Stroke Bed Area 36" x 60"

No. 93 1/4 D Toledo 150 Ton, 8" Stroke Bed Area 36" x 51"

PRESSES—TRIMMING

Bilas S-8 Trimming Press with Side Shear, 250 Ton Capacity, 8" Stroke 52" x 30" Bed Area

No. 3 Erie Flywheel Drive Trimming Press, 3 1/4" Stroke 13" Between Guides

No. 18 Erie Trimming Press, 100-150 Ton

PUNCH—BEAM

Long & Allistatter Double End Beam Punch, Capacity Beam Punch End—Punch Ranges and web 24" I-beam and smaller

PUNCH & SHEAR COMBINATIONS

Ryerson Steel Frame Universal Ironworker, M.D. Capacity Punch 1/2" thru 1 1/2" Shear 1" Square, 1 1/2" Round, 1 1/2" x 4" Plate 4 x 4 1/2" Angles

No. 28 U-30 Buffalo Armor Plate Universal Ironworker, Capacity Punch 1 1/2" thru 1 1/2" Shear 3" Round 3 1/2" Square, 5 x 1 1/2" Flat, 5 x 1 1/2" Angles

Style EF Cleveland Single End Punch & Shear, M.D. Capacity Punch 1" thru 1 1/2"

RIVETER

125 ton Hanna Bull Riveter, Air Driven, 24" Gap, 75" Reach, Capacity 1" rivets cold and 1 1/2" rivets hot

ROLL—PLATE STRAIGHTENING

7 Roll Bertsch Plate Straightening Machine, Capacity 10" x 1/2", Complete Elec. Equip.

ROLLING MILLS

7 1/2" Steckel Four High Rolling Mill, Max. Steel Width 6", Work Rolls 2 1/2" x 7 1/2", Complete with electrical equipment

8" x 10" Schmitts Single Stand Two High

12" x 18" Single Stand Two High, Comp. with Elec. Equip.

12" x 24" Waterbury Farrel Two High

18" x 24" Waterbury Farrel Two Stand Two High

20" x 36" Poole Two Stand Two High

22" x 40" Single Stand Two High

27" x 50" United Two High Skin-pass Mill

28" x 60" Single Stand Two High

18" x 60" Three High Roughing Mill, Complete with billet heating furnace and accessory equipment incl. elec. equip.

ROLL—TAPER FORGING

No. 10 Williams White Taper Forging Roll, Rolls 84" Dia., Shaft 8" Dia.

SAW

No. 3 Ryerson Friction Saw, 54" Blade Hydraulic Feed, Complete with Elec. Equip.

52" Ryerson Friction Saw, 45 H.P. Motor Capacity Approx. 9" Round, 20" I-beam, 12" H-beam

SHEAR—ALLIGATOR

No. 7 Thomas Carlin Alligator Shear, 16" Blade, 30 H.P. D.C. Motor

SHEARS—ANGLE

Hiles & Jones No. 2 Double Angle Shear, M.D. Capacity 6" x 6" x 1/4"

Long & Allistatter Double Angle Shear, Model B, Capacity 8 1/2 x 1/2", Complete with Elec. Equip.

SHEAR—BAR

No. 2 LH Lewis Open End Bar Shear, Motor Drive, Capacity 1 1/2" Round

SHEAR—GATE

10" x 1" Cincinnati Model 10010 Gate Shear, New 1946—Little Used

SHEARS—ROTARY

No. 60 Quickwork Rotary Shear, 1/2" Capacity

No. 100 King Rotary Shear, 1" Capacity

No. 30 Quickwork Rotary Shear, 5/16" Capacity

Quickwork Heavy Duty Circle Shear 1/2" Capacity

Complete with Circle Cutting Attachment

SHEARS—SQUARING

12" x 16" Stanco Steel Squaring Shear, Motor Dr. 8" x 1/2" Drahten Model T12 6/2500

8 1/2 x 3/16" Cincinnati Series 1408, Motor Driven

8" x 1/4" Long & Allistatter, Helled Motor Drive

SLITTERS

31" Yoder Sheet Slitter No. 530, Capacity 3 cuts .104" to 8 Cuts .156", Motor Dr.

72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS

No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3 1/4" bars or 4 1/4" O.D. Pipe or Tubing, NEW 1950.

No. 4 Kane & Ruch 8-Roll Straightener Capacity 3" Rounds or Squares, 3 1/2 x 1/2 Angles 3 1/2" Channels, etc.

No. 1 1/2 B Sutton Round Straightener, Motor Dr. Capacity Tubing 5/16" to 2 1/2"—modified to handle up to 3 1/4" O.D. tubing

No. 1B Sutton Round Straightener, Motor Drive Capacity 3/16" to 1/2" O.D. Friction Drive complete with 1/3 H.P. A.C. Motor

Hallden 8-Roll Strip Straightener, Flying Shear & Cutting Machine, Capacity 14" wide 11 Ga. Sheet Steel

STRETCHER

McKay Hydraulic Bar Stretcher, Capacity up to 1 1/2" dia. in lengths 12' to 27'

SWAGING MACHINES

No. El Langelier, Capacity 1 1/4" Tubing

No. 408 Eina Swager, Capacity 4" Tubing

TESTING MACHINES

300,000 lb. Southwark Emery Universal Hydraulic

60,000 lb. Olson 4 Screw Rotating Nut Tens Universal

20,000 lb. Southwark Emery Universal Hydraulic

TRIMMING LINE

21049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter, Capacity for steel or aluminum alloys 1/4" max. Trimmed width 22" min. 66" max., Scrap Length 3/4" min., 8 1/4" max.

TUBE MILL

Complete equipment for hot rolling seamless steel tubes ranging in sizes from 6 1/4" to 14 1/2"

WELDERS

250 KVA Progressive Model A-6 Flash Welder 440 volt 60 cycle, Mechanical Contactor Hi-Pressure Clamp Assembly—NEW 1949

McKay Tube or Pipe Welding Unit, Capacity 4 1/2" to 7 1/2" O.D., Complete with all accessory equipment and motors

WIRE DRAWING MACHINE

No. 0 Waterbury Farrel 7-Die Wire Drawing Machine, Capacity 1/4" rod to #10 copper

Manufacturing

ITTERBUSH & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8

Telephone Gortlandt 7-3437

Equipment

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

Confidential Certified Appraisals
Liquidations — bona fide Auction Sales Arranged

October 9, 1952

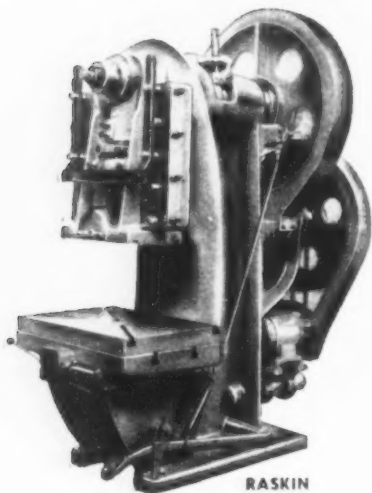
435

SEE

MOREY FOR

NEW MACHINE TOOLS...

FROM EUROPE'S FINEST MANUFACTURERS
STOCK DELIVERY—NO PRIORITY
MEASUREMENTS IN INCHES AND DECIMALS

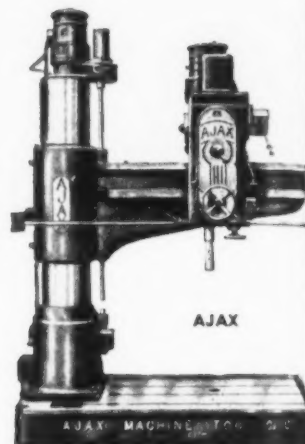


RASKIN

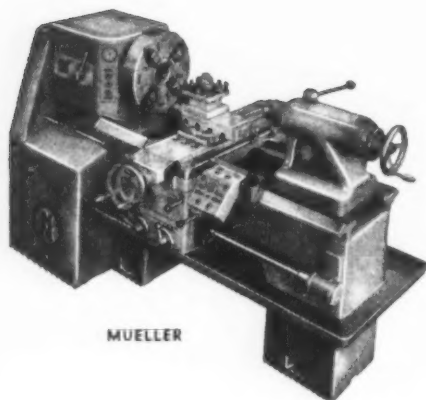


VIKING

VIKING—13" x 30", 40" & 60" centers. Engine Gap Lathes, anti-friction bearing. Spindle speeds 35-1200 RPM.



AJAX

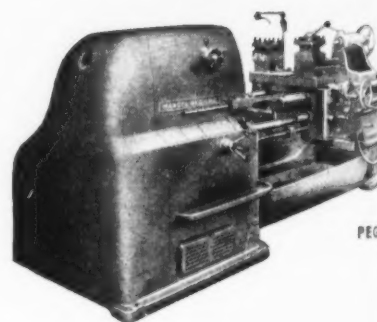


MUELLER

RASKIN—120-ton Geared End Wheel Press; others from 20 to 300 tons, OBI—SS Endwheel Type.

MUELLER—19" x 40" centers Production Lathe. Spindle Speeds: 250-1500 RPM. Also available with HYDRAULIC COPYING ATTACHMENT.

24" x 30" and 60" centers. "Electromatic" Production Lathe. Spindle speeds (infinitely variable): 50-750 RPM. CONSTANT CUTTING SPEED. Also available with HYDRAULIC COPYING ATTACHMENT.



PEGARD

HURE—Model #274 Vertical Milling Machine; Power rapid traverse. Table size 63" x 14 61/64".

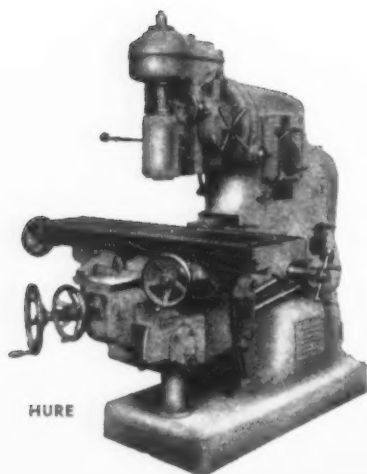
AJAX—Radial Drilling Machine. 4'6" arm x 13" column. Drilling cap: 2 3/4" mild steel; 3" cast iron. #4 MT. Spindle speeds (8): 60-1100 RPM.

PEGARD—13" x 60" and 16" x 60" centers. Geared Head Engine Gap Lathe, anti-friction bearing. Spindle speeds (16): 38-2000 RPM.

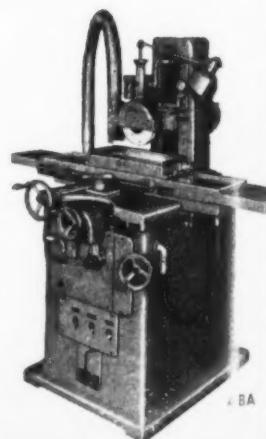
23" x 80" centers. Geared head Engine Gap Lathe, anti-friction bearing. Spindle speeds (12): 6-1000 RPM.

27" x 120" centers. Geared head Engine Gap Lathe, anti-friction bearing. Hardened and ground steel bedways. Spindle speeds (12): 6-1000 RPM.

ABA—8" x 24" Precision Surface Grinder, hydraulic, hand and table feed.

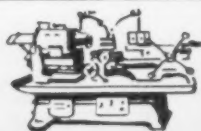


HURE



ABA

This represents selected machines. There are many other fine machines available —ask for complete list!



MOREY

...for more value!

MOREY MACHINERY CO., INC.
 Manufacturers • Merchants • Distributors
 410 BROOME ST. • NEW YORK 13, N.Y.
 TELEPHONE: CANAL 6-7400

AND

MACHINE TOOLS

AUTOMATIC SCREW MACHINES

GYMATIC Model 40 15/8" 6 spindle. Late
CLIFLAND 3 1/2, Model A; Late Type.

BORING MILLS—Horizontal

LANDIS #40, 4" Bar; floor type; M.D.
LANDIS #35 floor type; 3 1/2" bar; M.D.
LUCAS 41", table 24"x48"; M.D. Late
NILES 8" bar floor type, motor drive
UNIVERSAL 3" bar, table 40"x58", M.D. Late

BORING MILLS—Vertical

BETTS 120" 2 heads Rapid Traverse; M.D.
BUCHARD 54", N.E. Type; motor drive.
BUCHARD 42" spiral drive; M.D.; late type.
BUCHARD 8", 16" 6-spindle "A" Multi-automatic
COLBURN 72", 2 heads PRT. M.D.
NILES 53", 2 swivel heads, motor drive.
NILES 100", 2 swivel heads; motor drive
NILES 120", 2 swivel heads; Rapid Traverse;
M.D.

BRAKES & SHEARS

BESCO 16 gauge 60" Press Brake; NEW.
BESCO 12 gauge 72" Press Brake; NEW.
BESCO 26" 20 gauge Power Sq. Shear; NEW.
BESCO 48", 1/2" gauge Power Sq. Shear; NEW.
BESCO 72", 14 gauge Power Sq. Shear; NEW.
BESCO 96"x1/2" Power Sq. Shear; NEW.
BESCO 96"x1/4" Power Sq. Shear; NEW.
CHAMBERSBURG 500 HP, Billet Breaker; late
JAMES RENNIE No. 8 Univ. Ironworker; late
NIAGARA No. 116 Squaring Shears; late type.
QUICKWORK No. 5 3/4" rotary, M.D.
QUICKWORK No. 6, 1" capacity; motor drive.
WORMSER T-15; T-25; Univ. Ironworker; new

BROACHES

AMERICAN T-6-32 Vertical; hydr. 3-way; late.
CINCINNATI 1-30 Duplex Vert. Hydr.
COLONIAL, VGI 4-10-48; Vert. Hydr., late.
OILGEAR 3XA Horizontal Int.; Late.

DRILLS—Radial

CINCINNATI BICKFORD 6'15" Univ.; M.D.
KITCHEN & WADE 3' arm 12" col. M.D.

DRILLS—Miscellaneous

AVEY No. 3, Ball bearing, Motor drive.
BAKER No. 217; Motor drive.
BARNES No. 420 Deep Hole; late.
BARNES H-3 Hydram; hydr.; inverted; late.
BARNES H-2 Hydram; hydr.; M.D.
BARNES 20" 4-spindle Camel Back; Late.
CINCINNATI 21", Motor drive.
FOOTE-BURT 6", spindle, late type.
LEBLOND No. 2, deep hole, late type.
LEMAIRE, 6-spindle, late type.
MOLINE, 6-spindle Hole-Hog 3 1/4"; M.D.
NATCO No. 14 Mult.; Rect. Hd.; PRT; M.D.

GEAR CUTTING EQUIPMENT

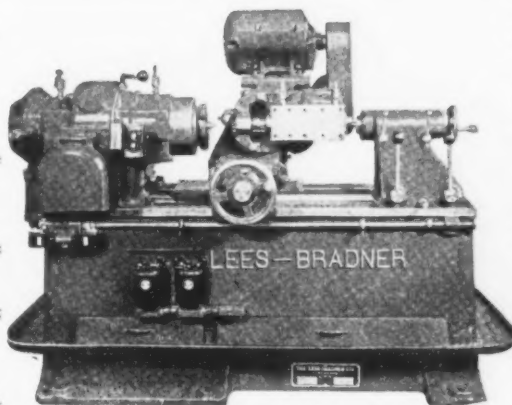
BILGRAM 6" & 16" Bevel Gear Cutter, M.D.
BROWN & SHARPE 6-72" Auto. Cutter; M.D.
CROSS #1, #40, #45 Tooth Rounders; M.D.
DETROIT type GG-35 Gear Grinder; late type.
FELLOWS Nos. 61A, 62Z, 75, 71, 7A, 72, 77
High Speed Gear Shapers; late.
FELLOWS 13-LS Lapper; late.
GLEASON #20 Tester; Late Type.
GLEASON 25" straight dbl. gear gen.; M.D.
GLEASON #13 bevel cutter-grdr. M.D.; late.
GLEASON 18" bev. gear Tester; M.D.
GLEASON #6 Revacycle; Late Type.
GLEASON No. 12 Tool Sharpener; late.
GLEASON 12" Straight Bevel Gen.; late.
GLEASON #4 & #6 Tester, Late Type.
GLEASON 10", 11" & 18" Bevel Gear gen.
GLEASON 24", 37", 77", 96" Bev. Gear Planer.
GLEASON No. 14 Hypoid Grinder; late.
MICHIGAN Finisher, Mod. 862-24-A, 24"; late.
MICHIGAN #854 Gear Shaver; Late.
PRATT & WHITNEY 10" Gear Grinder; late.

GEAR HOBBERS

BARRER COLMAN 12# Motor Drive.
BARRER COLMAN Type A; Late.
GOULD & EBERHARDT #12H; Late.
GOULD & EBERHARDT #18H, Motor Drive.
GOULD & EBERHARDT #36BM 3 spindle
Auto. Rougher; M.D.
KOEFFER WM-11 Auto.; bench type; Late.
PFAUTER RSI; Max. dia. 30"; late.

GRINDERS—Plain Cyl. & Univ.

BROWN & SHARPE #5 3x18" Pl. Cyl.; late.
CINCINNATI 14x72 Model EM Plain, Late.
LANDIS 16x36" Type C Plain, Hydr. Late type.



LEES-BRADNER Thread Milling Machine

LANDIS 10x36" Type C Plain, Hydr. Late type.
LANDIS 10x18" Type C; late type.
LANDIS 30"x240" Plain cyl., M.D.
NORTON 10x72; type C; plain; M.D.
NORTON 10x120; plain; M.D.
NORTON 14x50"; plain; Motor drive.

GRINDERS—Surface

ARTER 8" Rotary, M.D.
BILLITTER & KLUNZ 48"x196" Way Grinder.
BLANCHARD #16 Hi Power Vertical; Late.
HEALD #22 Rotary, 12" chuck; M.D.; Late.
PRATT & WHITNEY 14x36" Model B, Late.
THOMPSON 2V Special; late type.

GRINDERS—Miscellaneous

BRYANT No. 3 Internal; hydraulic; late.
BRYANT No. 5 Internal; hydraulic; late.
BRYANT No. 16-C-16 Internal; hydraulic; late.
BRYANT No. 16-CP-16 Internal; hyd.; late.
BRYANT No. 24 Internal; hydraulic; late.
EXCELLO #48 Carbide; Late.
HEALD 75A, special internal; late type.
HEALD No. 72-A-5 "Gagematic" Int.; Late.
HEALD No. 72-A-3 "Gagematic" Int.; Late.
HEALD 72-A-3, 72-A-5 Plain; Late.
HEALD No. 78 Internal Centerless; M.D.
LEMPCO 22x72" Mod. KG Crankshaft; Late.
VAN NORMAN 666 Crankshaft Regrind.
VAN NORMAN 639 Osc. type Radius; Late.

HEADS AND UPSETTERS

ACME 2" Model XN, late type.
AJAX 3 1/2" Upsetter, motor drive.
MANVILLE #3 DSD, Motor Drive.
MANVILLE #2 DSD, Motor Drive.
MANVILLE #1A DSSD, Motor Drive.
WATERBURY FARREL #11, DSSD, M.D.

LATHES—Engine & Mfg.

AMERICAN 36x33" centers geared heavy.
DENHAM 16x48" centers, Gap; late type.
DENHAM 12x54" centers, Gap; late type.
DENHAM 16x72" centers, Gap; late type.
GRAHAM NORMANTON 12"x48" centers; late.
HENDEY 12"x54" centers, belted motor drive.
JONES & LAMSON "FAY" 20x25" Auto. Late.
LEHMANN 16"x30" Hydratrol; late type.
LEHMANN 25x96" center; Timken; grd. M.D.
LEBLOND 16x36" center; Auto.; Timken; late.
LEBLOND Mod. 7ACL Crankshaft; M.D.
LODGE & SHIPLEY 14"x30" Centers, late type.
LODGE & SHIPLEY 16"x30" Centers, late type.
LODGE & SHIPLEY 24"x96" Centers, Late.
LODGE & SHIPLEY No. 5-24" and 96" centers
DUOMATIC Timken; Late.
LoSWING 4x60", 8x24", 8x108"; late.
MONARCH 14"x42" type Z, Magnamatic; late.
NILES 30"x46", 30"x50" Boring; "Time-Saver";
Timken; Late.
PORTER-MCLEOD 16"x6", 16"x8"; NEW.
PRATT & WHITNEY 16"x30", Timken; late.
REED-PRENTICE 14"x54", Timken; late type.
SPRINGFIELD 16"x30" Centers, Timken; late.
SPRINGFIELD 14"x43", geared; M.D.
SUNDSTRAND 10x60" Auto.; Late Type.
SWIFT 16"x72" Centers; M.D.; Late.
SWIFT 20"x120" Centers; Late.

LATHES—Turret

MOREY No. 2 ram type TIMKEN.
BARDONS & OLIVER #3 universal; late type.
GISHOLT 1L, Saddle type, M.D.
MAGDENBERG Model MWF-BG-250 Univ.
table type; P.R.T.; 12" hole through spindle;
cross sliding turret; M.D.; Late.
WARNER & SWASEY 4-A, Timken Bearing,
7 1/2" Bore, motor drive.

MILLING MACHINES—Pl. & Univ.

KEMPSMITH #2 Timken; Univ. M.D.
CINCINNATI 4-48, 4 spindle, Tracer; Late.
ROCKFORD Rigid-Mill #23; M.D.
STARR No. 2, table 13"x55"; late.
RICHMOND #2, light, late type.

MILLING MACHINES—Mfg.

CINCINNATI O-8 vertical; late.
GOULD & EBERHARDT 25 Cont. type; M.D.
INGERSOLL 32x24x16" Planer Type; 2 hds.
INGERSOLL 30x24x12" Adj. Rail Slab; M.D.
SUNDSTRAND Mod. 3A Duplex 42" feed; M.D.
TAYLOR & FENN M-80 Duplex Spline; Late.

MILLING MACHINES—Thread

HALL Style D Planetary, Late Type.
LEES-BRADNER HT 12"x54", M.D.; Late.
LEES-BRADNER HT 12"x36", M.D.; Late.
MOREY 12"x30" centers, 12x120" centers, late.
PRATT & WHITNEY 4 1/2x12 Mod. C; late.

PLANERS

BETTS CONSOLIDATED 108" x 84" x 44",
4 heads; PRT; Box Table; M.D.
GRAY 24x24x6; motor drive.
GRAY 36"x36"x10", 4 heads, PRT; Late.
LIBERTY 144"x76"x48" adj. variable, openside,
box table; 4 heads, PRT; M.D.
NILES 108"x84"x42", 4 heads; Rapid Traverse;
Box Table DC; M.D.
NILES-BEMENT-POND 72"x72"x30", 4 heads;
Rapid Traverse; M.D.
NILES-BEMENT-POND 60"x60"x12", Rapid
Traverse, 2 swivel heads, box table; M.D.

SAWS

CAMPBELL #401 Abrasive cut-off; Late.
ESPEN LUCAS No. 670 30" cap, Hydr.; Late.
GROB OS-20 metal band saw & filer; Late.
HELLER Model SS-1, 6 1/2" Cap Cold Saw.

SHAPERS—Slotters

DILL 18" Slotter; motor drive.
PRATT & WHITNEY 6" Vertical; M.D.
PRATT & WHITNEY 10" Vert., M.D.
LYND FARQUHAR 26" Openside; M.D.
NEWTON 15" Slotter; M.D.
ROCKFORD 36" Vertical, Hydr.; Late Type.

PRESSES

NEW Presses from 5 ton to 400 ton O.B.L.,
back flywheel, straight side.

Available from stock

BIRDSBORO 325 ton Vert. Hydr.; Late.
BLISS #6 SS DC 135 ton; 34"x95" bed; 2 1/2"
stroke; 60 SPM.
BLISS No. 410A Toggle Draw'g; tie rod; geared
BLISS No. 3 1/2A geared toggle; dbie. acting.
GLEASON 15" Quenching; hydr.; M.D.
HANNIFIN 6-ton, 16-ton; hydr.; Late.
NATIONAL #5 H.S. Maxi-Press (Forging).
SENTINEL, 25-ton OBI; NEW.
SHORE, 250 ton Hydr. Flanging & Forging.
WATERBURY FARREL 125 Ton; St. Side.

MISCELLANEOUS

BAKER #5 Keysenter; motor drive.
BARNES No. 172, 214 Honing; hydr.; Late.
BAUSH #1 Radial taper; late type.
FISCHER No. 1, Oil Groover; Late.
GROB OS-20 Metal Band Saw—Filer; M.D.
HUGH SMITH 1"x24" Plate bend, rolls; M.D.
LANDIS 2" Dble. Spdle. Throaders; M.D.
LEBLOND #2 Barrel Rifling Machine.
LEBLOND #2 Barrel Lapper; M.D.; Late.
MANVILLE #2C Screw Slotter; Motor Drive.
MANVILLE #1 Screw Slotter; Motor Drive.
MANVILLE No. 3 Trimmers; Late.
MANVILLE No. 3C Thread Roller; M.D.
SAUNDERS 8-18" Pipe Machine; M.D.
US TOOL 310-R Cutter Reliever; Late.
WATERBURY FARREL No. 11 Thread Roller.
WEYBRIDGE Slitter; 36x22 gauge; NEW.

Send for Latest Catalog

Available for Prompt Shipment

Most Built After 1941

MOREY FACILITIES FOR
CONTRACT REBUILDING ARE
AMERICA'S FINEST... INQUIRE!

THE CLEARING HOUSE

AARON HAS A TREMENDOUS STOCK ALL FOR IMMEDIATE DELIVERY

BORING MILLS

Bullard 24" V.T.L., Spiral Drive
Cleveland 2 1/2" Bar Cap.
Giddings & Lewis No. 32, 3" cap.
King 42", 72" Vert. 2 rail heads
Niles-Bement-Pond 4", 4 1/2" Bar, 60" Vert.
Niles-Bement-Pond 60" Vert.
New 3" Hor. Bar. Mills

DRILLS AND RADIALS

American 6"x15" Univ.
Baush Multi-spindle
Buffalo #2 Motor Spindle
Canedy-Otto 21" Sliding head New
Cincinnati Bickford 6"x15" col.
Natco #12 20 spindle drill, Baush
24" Sibley Sliding head
New Geared Box Col. Drills 24"
Foote-Burt #25 3" cap.
Leland Gifford 2 LMS 3 MS

ENGRAVERS

Deckel type 3 Dim., New
Gorton 35 Die Sinker
Gorton 32, 3U
Gorton #1A, ME, Deckel GIL
Taylor-Hobson 3 dim.

GEAR EQUIPMENT

Barber-Colman #2, #12 (3), Flather 72" Cutter
Fellows High Speed Shapers 712, 725, 71
Fellows #20M Redliner
Flather 72" Cutter
Gleason #2 Surface Hardener
Gould & Eberhardt 36" Cutter
Michigan Gear Finisher 24" cap., 862-24-A
National Broach Red Ring Lapper
Schuchardt & Shutte #1 Hobber

GRINDERS, MISCELLANEOUS

Bryant #5, Internal, chucking, 16A16
Cincinnati 6x18" Cyl. Hyd.
Grenby Models 1G1 & 1G2
Heald #73 Internal Centerless, Sizematic
Heald #31 Internal Gagematic
Heald 72A3 Int. Centerless Sizematic
Landis 6"x30" Type C Cyl., 10x24 Univ.
Norton Type C 6"x18" Semi-Automatic cyl.
Norton 6"x30", 10"x18" Type C cyl.
Norton 14"x6 1/2" cyl., 16x48 Univ.
Norton Roll Grinder 50"x28"
Oliver #510 Drill Pointer
Sellers 6T Tool, K.O. Lee tool
Van Norman #666 Crankshaft

GRINDERS, SURFACE

New 8x24" Hyd. Feed, 10x18"
Abrasive 8x24", #33 Vert. & #34
Blanchard #16, 26" Mag. Chuck
Heald 22-12" Chuck, Arter 12"
Norton 6x18" Hyd. 10x36" Hyd.
Portman 12" Chuck Rotary
Pratt & Whitney 12x36" Vert.
Reid 11x36 Motor in Base, 2A 6x18
Taft Pierce #1 Precision

LATHES

American 14"x30"
Bridgeford 36"x20", 32"x16"
Hendey 12"x42" and 12x30", 1941, 16x66"
Hendey 14" Yoke Head Lathes
LeBlond Regal 10"x31" bed, 19x42"
Lipe-Carbo 12"x18" (2)
Pratt & Whitney 16"x60—Late
Lodge & Shipley #3A, #3 Duomatics
New 16, 18, 20", 28" Immediate Del.
Reid Small Piece #9WSL
Rivett Model 918 Precision
Sundstrand 8x15", 15" Stub
Sebastian 12"x4" G.H., Sheldon 12"
Wickes 32"x35" Geared Head

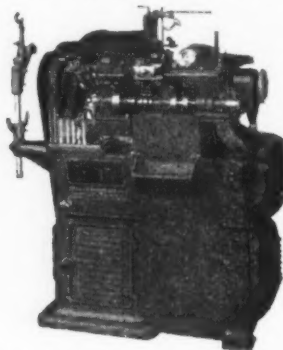
TURRET LATHES

Acme 6W Fox 2-9/16" Cap. #2 Cross Slid. Turret
Bardons & Oliver #2, 3, 5, 7
Brown & Sharpe, #2 Hand, #10, 11
Denver 6 2" Shell Turret (2)
Foster #28 2 1/2" Cap. Morey #2G Late
Gisholt 2L, Cross Slid. Tur. #5 Bar Feed, Chuck
Gisholt Simplimatic
Jones & Lamson #5, Bar Feed
Morey #2G Late
Oster 601 WD, #2 Simmons Microspeed
Warner & Swasey #1A, Timken Head
Warner & Swasey #1, 2, 3, #4 Preselector

This is but a partial listing. Write for free Catalog. Inquiries invited. HUNDREDS OF OTHERS.

AARON MACHINERY CO., Inc., 45 Crosby Street, New York 12, N. Y.
"CABLE—AARMACH, N. Y."

SCREW MACHINES AUTOMATICS



Brown & Sharpe (12) Model OG, serial Nos. 9600
& 10700 series, 3/8" capacity.
Brown & Sharpe (7) Model OG, serial Nos. 14
15, 16000 series, 3/8" capacity.
Brown & Sharpe (4) Model 2G, serial Nos. 8500
& 11500 series, 1 1/4" capacity.
Cleveland, Model AA-11, Serial #36586
Cleveland, Model B, Serial #42618 843, 1-1/16"
capacity.
Conomatic 4 Spindle, Serial 2309FF, 1 1/2" capac-
ity.
New Britain Gridley 61 & Spindle, Serial No.
25410, 1 1/8" capacity.

NEW IN STOCK

Air Hydraulic Presses — Arbor Presses
#6C Famco—Band Saws Kalamazoo—
Famco 6x12"—Drill Presses all sizes—
Hydraulic Press Northern 20 Ton —
Injection Molders, 1 ounce — Power
Presses, OBI, 1, 4, 4 1/2, 5, 7 1/2, 10, 15,
20, 30, 55, 85 ton—Shaper 7" Amco, 8"
Shaperite—Shears, Foot 22" to 8", 16
& 18 ga.—Shears, Power 3"x18 gauge
to 10' x 10 ga.—Welders, Arc, Seam,
Spot all sizes Motors, Grinders, Buffers.

PRESSES

Bliss 645, 650 Hi-Production Presses
Bliss 18, 21, OBI, 59, 62, 162, OB
Bliss 4 1/2 Double Action, Roll Feeds, Cam (2)
Bliss #78 1/2, 330 Ton SS, Bliss 74 1/2
Hamilton 850 Ton S. S. Bed 27x48
Hamilton 110 FM Die Tryout Press
Bliss 5-48 Dbl. 32x48" bed, Cushion
Toledo 92 1/2 c Dbl. Crank 43x23" bed.
New 85, 60, 55, 30, 20, 15, 10, 5 Ton O.B.I.
Niagara Horning, 15 Ton
Niagara A1 1/4 O.B.I.
Toledo 29 Double Action Cam
V. & O. #102 O.B.I. Reducing
Walsh No. 3 O.B.I. 23 Ton, LJ #3

MILLS, PLAIN, UNIV. PROD.

Brand New Universal Mills No. 1, No. 2

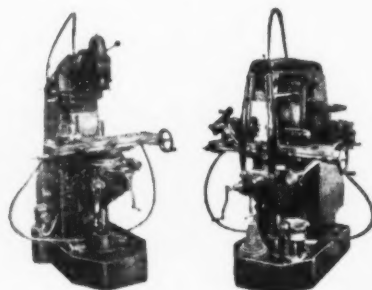
Archdale Plain, 14", Production
Brown & Sharpe #3B Plain, Late, 3A, 21, #2L
Cinn. No. 3, 4 Plain Spd., 18" Manufacturing
Kent Owens IV, I-8, I-14, IM
Kempsmith #1 Pl., Vert. & Div. Hd
Milwaukee 2K, 2H Univ., 2H Plain.
Milwaukee #2B, Plain & Univ.
Sundstrand #00, 0, Rigidmills
Sundstrand #3A Rigidmill with copying Attach.
Van Norman #2L Univ.

MILLS, VERTICAL

Brand New Vertical Mills

Cincinnati #3, #4 hi-power, #4 Dial Type
Cincinnati 03 Vertical
Morey #12M Profiler, 2 sp.
Pratt & Whitney Profiler 12B, 2 sp.

MILLS, VERTICAL, NEW

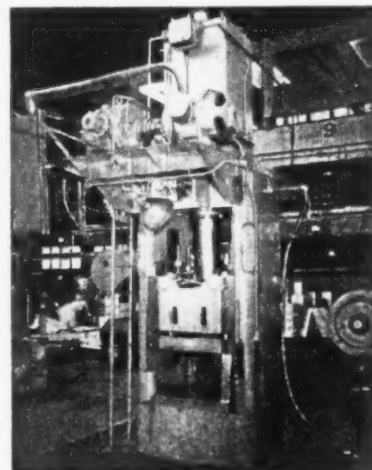


New Vertical Mill
Universal Table,
Swivel Head

New Universal Mill
with Dividing Heads
and Vertical Attach.

MISCELLANEOUS

Band Saw: DoAll Zephyr 36", 1" O Metalmaster
Bolt & Pipe Threader: Landis, Oster-Williams
#915 Pipe & Nipple Threader
Broach: 3L LaPointe Hydro. Horiz. New Klink. 6
Ton
Hack saw: Peerless 6"x6"
Honer: Micromatic H-4
Keyseater: Davis, Baker
Oil Groover: WICACO
Shapers: 24" Rockford, 24", 28" Gould & Eber-
hardt, Cinn. 20", 24"
Shears Power: George Ohl 10' 3/16", 10' x 16
gauge, 11' x 16 gauge
Welder: 50 KVA Eisler Air Operated, New Seam
Welder: Taylor-Winfield 50 KVA Hi-Wave



150 Ton H.P.M. Triple Action Press 50 ton
cushion, 50 ton blankholder, bed 36" x 36"

HYDRAULIC EQUIPMENT SELF CONTAINED PRESSES

150 Ton Triple Action HPM Press
125 Ton Southwark Press, Bed 96"x30".
30" stroke, 2 to 4 ft. opening
8 and 9 oz. Injection Moulders

MISCELLANEOUS PRESSES

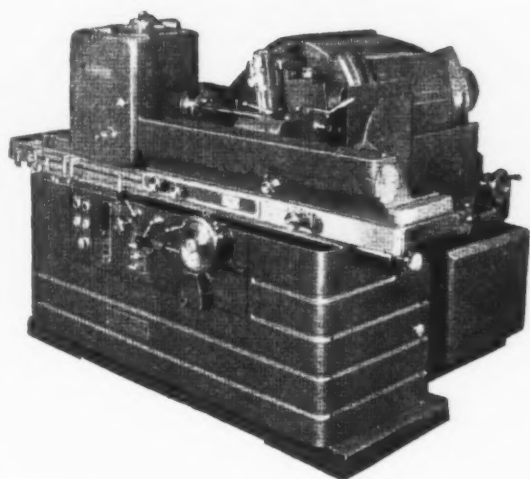
300 Ton Watson Stillman 20"x20"
Platen 8" St. 19" opening

All Hydraulic Equipment is completely
engineered and checked by a competent
staff, thus assuring reliability. Send us
your Hydraulic problems.

THE CLEARING HOUSE

EMERMAN Offers from STOCK

FOR SALE OR RENT



NO. 35 EXCELLO PRECISION THREAD GRINDER

Max. diameter of work ground (with 18" wheel) 8"

Max. diameter of work ground (with 14" wheel) 12"

Max. diameter work inserted through work spindle $1\frac{5}{8}$ "

Max. threaded portion of work (from Headstock center) 22"

Grinding wheel speeds, 1485, 1575, 1670, 1780, 1910, 2040, 2150, 2290, 2450, 2640 R.P.M.

Work spindle speeds—grinding 2 to 160 R.P.M.

Approx. weight: 9200 lbs.

*Monthly rental approximately \$375.00 per month.

25" x 72" LANDIS HYDRAULIC PLAIN CYL. GRINDER

30" diameter x 3" face grinding wheel

With 3 A.C. 220/440 volt motors & electrical equipment

*Monthly rental approximately \$500.00 per month.

GEAR MACHINES

No. 7125A Fellows Gear Shapers, 1943

No. 72 Fellows Gear Shaper, 1945

No. 61-A Fellows Gear Shaper, 1942

8H Gould & Eberhardt Gear Hobber

No. 140 Cleveland Rigid Hobber, 1947

NO. 7125A FELLOWS HIGH SPEED GEAR SHAPER

Max. pitch dia. ext. spur 7"

Max. pitch dia. ext. helical 7"

Max. pitch dia. int. spur or helical 6"

Max. pitch spur $5\frac{7}{8}$ "

Max. face width 2"

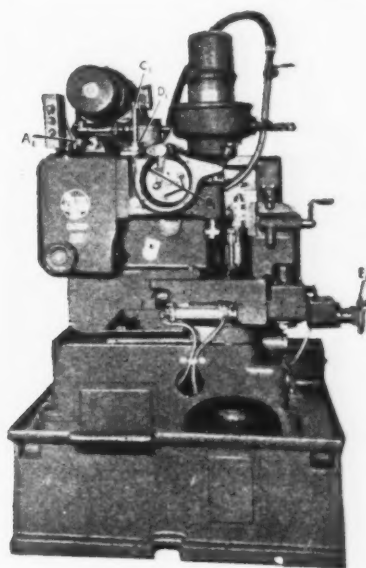
Max. helix angle 45 deg.

Equipped with $1\frac{1}{2}$ H.P. 3 phase, 60 cycle, 220/440 volt, 1135 R.P.M.

With 2" raising block

Weight approx. 3100 lbs.

*Monthly rental approximately \$165.00 per month.



NO. 1402 MILWAUKEE SIMPLEX MILL

Timken bearing spindle

Spindle speeds, 12; 20-200 R.P.M.

Table working surface 72" x 13"

Table travel 24"

Power rapid traverse

Feeds $\frac{1}{2}$ " to 20" per min.

Spindle adjustable in and out, up and down

Weight approx. 9,000 lbs.

*Monthly rental approximately \$200.00 per month.

LATHES

4—No. 1FU FOSTER FASTERMATICS, Complete equipped, Air Chuck, Air Cylinder, Turret Tools, Hydraulic Cross Facing Attachments, New 1941

*Monthly rental approximately \$425.00 per month.

*All monthly rentals apply in full against purchase price.

EMERMAN MACHINERY CORP.

865 WEST 120th STREET

PULLMAN 5-7626

CHICAGO 43, ILLINOIS

October 9, 1952

439

THE CLEARING HOUSE

Eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

MANUFACTURING LATHES

No. 3 Lodge & Shipley Duomatic, m.d.
Model B1— $\frac{1}{4}$ H.P. Blount Speed Lathe, m.d.
W. C. Lipe Carbomatic Lathe, m.d.
Colborne Mfg. Bench Type Speed Lathe, m.d.
No. 4 LeBlond Boring Lathe, 37" bed, 13" hole
No. 9, 12 LeBlond Multi-Cut, m.d.
 $3\frac{1}{2}$ "x36", $3\frac{1}{2}$ "x80", 4x60", 8x84" LoSwing, m.d.
8x132" LoSwing, m.d., latest
9x12" Sundstrand, s.p.d.
11x18" LeBlond Rapid Production, m.d.
12x18" centers Monarch Model 5T, m.d.
17"x6" LeBlond Automobile Mfg., cone
17"x8" LeBlond Automobile Mfg., cone
20"x8" LeBlond Mfg., m.d.
21"x8" LeBlond Turret Lathe, cone
Schauer Type NA28 Speed Lathe, m.d.

ENGINE LATHES

12"x6" Lodge & Shipley Geared Head, m.d., taper
13"x30" centers Pratt & Whitney Model B, m.d., taper
14"x6" bed Hendey Geared Head, m.d., taper
14"x6" Lodge & Shipley Geared Head, m.d.
14"x6" Pratt & Whitney, cone
14"x6" LeBlond, cone
14"x6" Sidney Geared Head, m.d.
14"x6" Springfield Geared Head, m.d., taper
14"x8" Prentice, m.d., taper
14"x8" Sidney Geared Head, m.d.
15"x8" LeBlond, m.d., taper
16"x36" Pratt & Whitney Geared Head, m.d.
16"x54" centers American, m.d.
16"x6" Cisco Geared Head, m.d.
16"x6" Hendey Geared Head, m.d.
16"x6" Hendey Yoke Head, taper

16"x6" Lodge & Shipley Selec. Head, m.d.
16"x6" Lodge & Shipley, cone
16"x6" bed Monarch Geared Head, m.d.
16"x84" Pratt & Whitney Type B, m.d.
16"x8" Reed-Prentice Heavy Duty, cone, taper
16"x8" Monarch, cone, motorized
17"x6" LeBlond Geared Head, m.d.
18"x5" LeBlond Geared Head, m.d.
18"x6" bed Lodge & Shipley, cone, motorized
18"x6" Greaves-Klusman Geared Head, m.d. in leg
18"x7" Hendey Geared Head, m.d., taper
18"x8" Hendey Geared Head, m.d.
18"x8" Lodge & Shipley Selec. Head, m.d.
18"x8" Champion, cone
18"x8" Whitcomb-Blaisdell Geared Head
18"x8" bed Walcott, cone, motorized
18"x10" Boye & Emmes, m.d.
18"x10" Springfield Geared Head, m.d., taper
19"x6" centers LeBlond Geared Head, m.d., taper, late
20"x10" bed Schumacher & Boye, cone, motorized
20"x8" bed American Geared Head, m.d., taper
20"x8" Cisco, cone
20"x8" bed Greaves-Klusman Geared Head, m.d. in leg
20"x9" bed Boye & Emmes
20"x10" Boye & Emmes, cone
20"x10" Lodge & Shipley Geared Head, m.d.
20"x10" Sidney Geared Head, m.d.
21"x8" Heavy Duty LeBlond Geared Head, m.d.
21"x10" LeBlond Geared Head, m.d.
23"x12" LeBlond Geared Head, m.d., taper
23"x12" LeBlond, cone, motorized
23"x14" bed LeBlond Geared Head, m.d., taper

24"x10" Lodge & Shipley Geared Head, m.d. taper
24"x10" American, cone
24"x10" Greaves-Klusman Geared Head, m.d.
24"x12" bed Boye & Emmes, belt drive
24"x12" Bridgeford Geared Head, m.d., taper
24"x13" bed Lehmann Geared Head, m.d., taper
24"x16" bed American, cone, motorized
24"x16" bed Cisco, cone, motorized
24"x24" bed Lodge & Shipley Geared Head, m.d. taper
24"x30" bed American Geared Head, m.d., taper, late
25"—50"x8" centers LeBlond Gap Lathe, m.d.
26"x8" Bridgeford Geared Head, m.d.
30"x12" Niles-Bement-Pond, m.d., taper
30"x13" bed Niles-Bement-Pond, m.d.
30"x16" bed Lodge & Shipley Geared Head, m.d. taper
36"x12" bed Lodge & Shipley, m.d.
36"x38" American Triple Geared Internal Face Plate Drive, m.d., taper
48" American (raised to swing 54") x 17" bed, m.d.
42" Putnam (raised to swing 58 $\frac{1}{2}$ ") x 20" bed Geared Head, m.d., 11'8" centers
30" raised to swing 44" x 15" bed American, m.d.

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio

MEIrose 1241



CABLE ADDRESS
EMCO

IT'S ARTCO FOR STEEL

(Most items do not require CMP)
All for prompt shipment.

OPEN HEARTH (SAE 1020) STEEL PLATES—LARGE TONNAGE

$3/16"$ x 60" x 120"
 $1/4"$ x 60" x 240"
 $5/16"$ x 72" x 240"
 $3/8"$ x 72" x 240"
 $7/16"$ x 60" x 240"
 $1/2"$ x 72" x 240"

$9/16"$ x 60" x 240"
 $5/8"$ x 72" x 240"
 $3/4"$ x 72" x 240"
1" x 72" x 240"

$1\frac{1}{8}"$ to 6"—Various Sizes in Stock

HOT ROLLED SHEETS AND STRIP

100 tons—10 gauge x 59 $\frac{1}{4}"$ x 120"
350 tons—11 gauge x 59 $\frac{1}{4}"$ x 120"
50 tons—11 gauge x 20" x coils
55 tons—12 gauge x 36" x 72"
120 tons—18 gauge x 35" x 69"
15 tons—22 gauge x 40" x 80"
45 tons—24 gauge x 36" x 72"

DEFORMED REINFORCING BARS

200 tons— $5/8"$ x 40"—Mild
Carload Tonnage— $3/8"$ to $1\frac{1}{2}"$ to
ASTM-A-305 (Hi-Bond)—Early Shipment

STANDARD I BEAMS

3" to 15"—All Standard Weights—
Early Shipment

WIDE FLANGE BEAMS

6" x 6" x 20# x 40'
8" x 8" x 31# x 40'
8" x 8" x 40# x 40'
10" x 10" x 49# x 40'
10" x 10" x 60# x 40'
12" x 12" x 65# x 40'

MILD STEEL ANGLES

45 tons— $1\frac{1}{4}"$ x $1\frac{1}{4}"$ x $3/16"$ x 20'
20 tons— $1\frac{1}{2}"$ x $1\frac{1}{2}"$ x $3/16"$ x 20'
60 tons—2" x 2" x $3/16"$ x 20'
50 tons—3" x 3" x $3/8"$ x 40'
50 tons— $3\frac{1}{2}"$ x $3\frac{1}{2}"$ x $5/16"$ x 40'
50 tons—4" x 4" x $3/8"$ x 40'

Various Items 1" to 6" in Many Grades Forging Quality Bars.

Many other sizes and gauges available in I Beams, H Beams, Angles,
Channels, Flats, Rounds, Plates, Sheets, Oil Country Goods, etc.

ARTCO

INDUSTRIAL COMPANY, INC.

50 CHURCH ST.
NEW YORK 7, N. Y.

TEL: WOrth 4-3386
CABLE: "ARTCOINDUS"

THE CLEARING HOUSE

for full production without overload!

DEUTSCHE NILES | VERTICAL TURRET LATHE

Rigid Construction • Easy Operation

**IMMEDIATE
DELIVERY
FROM STOCK**

Precision made in Germany, this fine vertical turret lathe is equipped with American built motors, American built electrical equipment and conforms to American standards throughout. ALL GRADUATIONS ARE IN INCHES!

Speeds and feeds are easily controlled—All levers, manual and rapid traverse settings are controlled from the operator's position. Idle time is reduced to a minimum!

Designed for turning with TUNGSTEN CARBIDE TOOLS, the Deutsche Niles combines extremely rigid construction with precision workmanship to make possible the use of full power input without overloading the machine!

Partial Specifications

	41"	55"
Swing with side head in position	41"	57"
Swing with side head below table	51"	57"
Vertical travel of ram	31"	23½"
Horizontal travel, side head ...	19½"	27½"
Speeds (12)	11.8 to 150 RPM	5.1 to 80 RPM
Motor Drive	25 HP	30 HP

Write today for complete specifications and details!



J. M. LEHMANN COMPANY, INC.

Manufacturers of Machinery and Rebuilders

550 NEW YORK AVENUE
LYNDHURST, NEW JERSEY

TELEPHONE: RUTHERFORD 2-7890 • CABLE: IMLEMAN, NEW YORK



THE CLEARING HOUSE

GUARANTEED TOOLS

40"x20" NILES-BEMENT-POND Geared Head Engine Lathe, rapid traverse

27"x12" MONARCH Geared Head Engine Lathe, taper attachment, AC-MD

24" x 72" centers BOYE & EMMES Heavy Duty Geared Head Engine Lathe, chuck, AC-MD.

No. 3L GISHOLT Universal Saddle Type Turret Lathe, bar feed, chucks, collets, tooling, hardened ways, rapid traverse, new 1943. Perfect Condition. Immediate Delivery.

No. 28 FOSTER Geared Head Turret Lathe, rapid traverse, AC motors

42" BULLARD New Era Type Vertical Turret Lathe, AC-MD

36" BULLARD Vertical Turret Lathe converted to Spiral Drive, AC-MD

1 1/2" LANDIS Double Head Bolt Threader, with leadscrews, MD

No. 1 DOUGLAS Plain Horizontal Mill, table 8"x32", power feeds, motor in base, No. 40 taper, new 1942.

No. 2 VAN NORMAN Plain Horizontal Mill, power rapid traverse, No. 50 taper, new 1942.

No. 3-24 CINCINNATI Plain Hydromatic Mill

5-13" column CARLTON Radial Drill AC motor on arm, 15 to 1500 RPM

4" AMERICAN High Speed Sensitive Radial Drill 9" column, AC motor on arm

3 Spindle FOSDICK Drill Press, individual AC motors for each spindle, 1942

No. 6 TOLEDO O.B.I. Press, 56 Tons

10"x24" NORTON Hydraulic Surface Grinder, 1942

25A HEALD Rotary Surface Grinder, 24" diameter, magnetic chuck

36" OHIO Dreadnaught Shaper, AC-MD

75 Ton HENRY & WRIGHT Double Crank Dieing Machine, roll feed & Scrap cutter

No. 22 MURCHEY Threader

No. 135 CLEVELAND Rigidhobbers

O'CONNELL MACHINERY CO.

Tel. BAiley 5600

1693 GENESEE ST. BUFFALO 11, N.Y.

#32 Lucas Precision Horizontal Boring Mill—Serial #32-18-21.

6' American Radial Drill—Serial #55592

#61A Fellows Gear Shaper

#3 Gisholt Turret Lathe—Serial #2807-1

16" Gould & Eberhardt Shaper

#72A Heald Sematic Internal Grinder—Serial #24498

60" Hanchett Face Grinder

Lodge & Shipley Lathe—Serial #29051

#2 Norton Tool & Cutter Grinder—Serial #3355

6D Potter & Johnston Automatic Chucker—Serial #70393

72" King Heavy Duty Vertical Boring Mill Serial No. Lot 38—#175

Rowbottom Cam Miller—Serial 135/49. Rebuilt & guaranteed

20" Knight Rotary Table

Hazard Brownell Machine Tools, Inc.

350 Waterman St. Providence 6, R. I.

Statement of the Ownership, Management, and Circulation, required by the Act of Congress of August 24, 1912, as amended by the acts of March 3, 1932, and July 2, 1946 (Title 39, United States Code, Section 233) of THE IRON AGE, published weekly at Philadelphia, Pa., for October 1, 1952.

1. The names and addresses of the publisher, editor, managing editor and business managers are:

Publisher, George T. Hook, 100 E. 42nd St., New York 17, N. Y.

Editor, T. C. Campbell, 100 E. 42nd St., New York 17, N. Y.

Managing Editor, G. F. Sullivan, 100 E. 42nd St., New York 17, N. Y.

Business Manager, None.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership, or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Chilton Company, Inc., Chestnut and 56th Sts., Philadelphia 39, Pa.

Mary M. Acton, 260 Sycamore Avenue, Merion Station, Pa.; Mrs. Beulah Fahren-dorf, 59 Drake Road, Scarsdale, New York; Dorothy S. Johnson, 1115 Fifth Avenue, New York, N. Y.; Mabel M. Musselman, 260 Sycamore Avenue, Merion Station, Pa.; John Blair Moffett, 1608 Walnut Street, Philadelphia, Pa.—Agent for J. Howard Pew, J. N. Pew, Jr., Mabel P. Myrin, Mary Ethel Pew; Ethel G. Breen, Trustee u-w of Charles W. Anderson, Old Greenwich, Conn.—Beneficiaries: Robert C. Anderson, Percival E. Anderson, Charles W. Anderson, Jr., Annie L. Clark; Elizabeth J. Bailey and Ellwood B. Chapman, Trustee Estate of James Artman, Decedent, 930 Real Estate Trust Building, Philadelphia, Pa.—Beneficiaries: Franklin Artman, Vera Watters, Alvin C. Artman, Elizabeth J. Artman, Marion A. Pratt, George H. Pratt, by assignment, Edwin Moll, by assignment; Frederick S. Sly, 149-40 35th Avenue, Flushing, Long Island, New York; Mabel M. Musselman, Mary M. Acton & John Blair Moffett, Trustees u-w of Clarence A. Musselman, Decedent, 1608 Walnut Street, Philadelphia, Pa.; Charlotte M. Terhune, 160 E. 48th Street, New York, New York.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above was 21,638. (This information is required from daily, weekly, semi-weekly and tri-weekly publications.)

GEORGE T. HOOK, Publisher

Sworn to and subscribed before me this 22nd day of September, 1952.

MAE A. GATZENMEIER

My commission expires March 30, 1954.

[Seal]

FLANGERS, 1/4" & 1/2" McCabe (2)
RADIAL DRILL, 5' 15" Col. Amer. Tri. Purp., M.
RADIAL DRILL, 3 1/2" Morris, 9 1/2" col.
LATHE, 48" x 20" Bed Amer., T.A., M.D.
LATHE, 14" x 8" Bed Amer., 16 1/2" Sw., T.A., M.D.
SLOTTER, 20" Bement Miles, M.D.

LETCHER W. BENNETT & SONS
P. O. Box 544 CLIFTON, N. J.
PHONE—PRESCOTT 9-8998

6000 Lb. Chambersburg double frame Steam Forging Hammer.

2000 Lb. Erie Steam Drop Hammer, late type.

Multiple Punch No. 30-A W. W. 600-ton.

Multiple Punch No. 6 Cleveland 750-ton.

Multiple Punch Size G. L. & A. 940-ton.

300 Ton Oil Geared High Speed 2-Column Hydraulic Press, Stroke 18", ram 27" x 23".

750 Ton Williams White Self-Contained Down Moving Hydraulic Press, Bed 36" x 42", practically new.

Nipple Threading Machines (3), New 1950, 1/2", 1 1/4", 2". Roller Pipe Cutter.

H. & J. Straightening Rolls 5/8" x 48".

Kane & Roach #24 Angle Bender, Capacity 6 x 6 x 1".

5" Ajax Upsetting & Forg. Machs. twin gears, twin flywheels, susp. slides.

National Upsetting & Forg. Machs. 2", 4".

Ajax and Acme Upsetting & Forg. Machs. not susp. slides, sizes from 1" up.

Williams White Horizontal Bender & Straightener, Capacity 15" beams.

W.W. Bulldozers, #22, #3, #4, #29 Speed; #29-U type, reversing clutch.

Chambersburg Board Drop Hammers, 800 lb., 1200 lb., 2000 lb., 3000 lb.

Niagara Shear, Capacity 3 ft. 3/16".

Nazel Air Forg. Hammer #6-B, 7" sq. Bradley Hammers, Cushioned Helve, Up-right & Compact.

Bar Shear #12 B. C. Buffalo 5" Rd. Bar Shears, Open End., Table cast on Slant; also Guillotine 1 1/2" to 3".

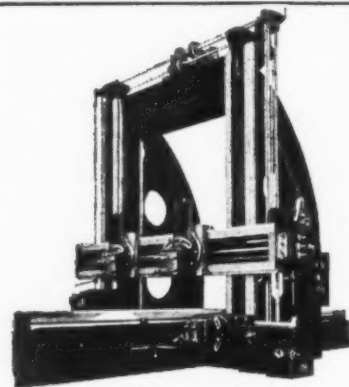
Knuckle Joint Press 200-ton, 6" str.; EG-54 Ferracute 400-ton.

600-ton R. D. Wood Incl. Hydr. Locomotive Wheel Press, 96" betw. bars.

#50-A Quickwork Whiting Rotary Shear 3/4".

BOLT, NUT & RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES, POINTERS.

DONAHUE STEEL PRODUCTS CO.
1913 W. 74th Street, Chicago 36, Ill.



96" x 120" High x 20" Betts Planer, Rapid Trav. Rev. Mo. Dr.

60" x 60" x 18" Bethlehem (D & H) Openside Planer Box Table, Power Rapid Trav., Forced Feed. Lub. Rev. Mo. Dr.

100" Cinn. "Massive Type" Vert. Boring Mill Mo. Dr.

72"x72"x12" Sellers Planer, 3 Hds. Mo. Dr.

60" x 60" x 14" Pond Planer, 4 Hds. Box Table Rev. Mo. Dr.

60" Bement Engine Lathe 30' Centers, Taper Atttchmt. (Raised to swing 84")

MACHINE TOOLS SALES COMPANY
36 S. Delaware Avenue Philadelphia 6, Pa.
Telephone: WA 2-1120

THE CLEARING HOUSE

RAILROAD EQUIPMENT—FOR SALE

USED

AS IS

RECONDITIONED

STANDARD GAUGE FREIGHT CARS

Box, Double Sheathed, 40-Ton Capacity
Box, Single Sheathed, 50-Ton Capacity
Caboose, Eight Wheel, Cupola Type
Flats, 40 & 50-Ton, Steel Underframe, 40'0" long
Gondolas, Composite, 40-Ton Capacity
Gondolas, Composite or All-Steel, 50-Ton

Hoppers, Covered, All-Steel, 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
Tank, 3,000-Gallon, High Pressure
Tank, 8,000-Gallon, Coiled and Non-Coiled

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

HEAVY DUTY FLAT CAR

95-Ton, All-Steel Underframe, Length 30' 2"

STANDARD GAUGE AIR DUMP CARS

Side Dump, 20-Yd., 40-Ton, Lift Door
End Dump, 20-Yd., 50-Ton, Drop Door
End Dump, 10-Yd., 30-Ton Lift Door

OTHER EQUIPMENT

Locomotive Cranes
Overhead Cranes
Railroad Track Scales

STANDARD GAUGE DIESEL-ELECTRIC ROAD SWITCHING LOCOMOTIVE

1500 H.P., 120-Ton, Type 0-4-4-0

Send us your inquiries

We Buy Freight Cars for Dismantling

Send us your offerings

IRON & STEEL PRODUCTS, INC.

REPAIR PARTS

For
All Types of
Freight Cars

General Office

13496 S. Braimard Ave.
Chicago 33, Illinois
Phone: BAyport 1-3456

New York Office

50-b Church Street
Phone: BEekman 3-8230
New York 7, N. Y.

STORAGE TANKS

6,000 Gallon
8,000 Gallon
10,000 Gallon

"ANYTHING containing IRON or STEEL"

LLEWELYN ASSOCIATES, INC.

NEW — Suppliers of Equipment — REBUILT

FOR THE STEEL INDUSTRY

Current Availability

2—27" x 56" United 2-Hi Temper Mills, complete with motor, drive, reels, and all auxiliary equipment.

1—Columbia Power Squaring Shear 10' x 3/16"—18" gap, complete with back gauge.

1—Rendleman Rotary Type Flying Shear, capacity 1/2" to 3/4" bars, 850 feet per minute, in lengths 40 to 45 feet.

1—Wean Engineering Company Coiler, capacity 62" maximum diameter, inside diameter approximately 28". Requires 60-50 HP drive motor, motor not included.

1—Pexto-Wilcox Shear, 14" x 96", 14 gauge mild steel capacity, complete with back gauge.

1—Badger State Portable No. 1 Alligator Shear, 6" knife, capacity 1" rounds. 2 HP 710 RPM motor (without motor).

1—76" Hot Strip Mill McKay Decoiler, maximum OD coil 48", maximum width coil 72" x 12 gauge. 125 HP, 230 volt, DC motor, speed of machine 50-200 FPM.

1—General Electric 2000 HP motor complete with General Electric controls—plugging forward and reverse. 236 RPM, 3 phase, 60 cycle, 2200 volt.

LLEWELYN ASSOCIATES, INC.

CABLE ADDRESS:
PITLYN

440-1-2 OLIVER BUILDING
PITTSBURGH 22, PENNSYLVANIA

PHONES
ATlantic 1-8086
ATlantic 1-7880

THE CLEARING HOUSE

MACHINE TOOLS

BORING MILLS
No. 0 G&L Horizontal Boring, Drilling and Milling Machine
Nos. 31 & 32 LUCAS Horizontal Boring, Drilling and Milling Machine
36" BULLARD Vertical Turret Lathe
100" BETTS Vertical Boring Mill

DRILLS
3'9" CINCINNATI BICKFORD High Speed Radial,
41
No. ES NATCO Multiple Spindle Drill—Hyd. table,
42

GEAR EQUIPMENT
Nos. 64, 72 & 725A FELLOWS Gear Shapers
No. 12 FELLOWS Gear Shaver, 1943
No. 368M GOULD & EBERHARDT Gear Rougher

GRINDERS
No. 5 B&S 3" x 12" Plain Grinder
6" x 18" CINCINNATI Plain Hyd. Cyl.—Filmatic
6" x 18" LANDIS Type C Plain Grinder
8" x 18" CINCINNATI Pl. Saddle Type Grinder
6" x 18" NORTON Vertical Spindle Surface Grinder
10" x 24" LANDIS Universal Grinder
10" x 72" LANDIS Type C Hyd. Pl. Grinder—42
No. 104 RIVETT Internal-External Grinders
No. 73 HEALD Internal Centerless Grinders
No. 172 HEALD Internal Grinder

LATHES
12" x 34" MONARCH Toolmaker's Lathe
14" x 54" REED PRENTICE Geared Head Engine Lathe
18" x 30" LODGE & SHIPLEY Toolroom Lathe, 41
27" x 14" LEBLOND HD Engine Lathe, 42
30" x 16" bed AMERICAN "High Duty" GH
36" x 19" bed AMERICAN HD Lathe
42" x 25" ee AMERICAN "Super Productive" GH Lathe—two carriages

MILLERS
Nos. 0-8 CINCINNATI Plain and Vertical Milling Machines
Nos. 1-8 & 1-12 KENT-OWENS M.D. Prod. Millers
Model MM-5 U.S. Multi-Miller
No. 2B&S Pl. Light Type Miller
No. 2M CINCINNATI Vertical Millers, 1941
18" CINCINNATI Mfg. Knee Type Milling Machines
4 1/2 x 38" P&W Model C Thread Miller
36" x 38" x 16" INGERSOLL Planer Type Milling Machine—3 heads
38" x 36" x 12" INGERSOLL Planer Type Milling Machine—3 heads Late

AUTO. LATHES & TURRETS
No. 2B&S Wire Feed Hand Screw Machine
No. 2 WAS Geared Friction Hd. Turret Lathe
No. 3 B&O Ram Type Universal Turret Lathe
No. 3 J&L Ram Type Universal Turret Lathe
No. 1H5 LIBBY Heavy Duty Turret Lathe
No. 11 GISHOLT Saddle Type Turret Lathe, 1942
Nos. 44 & 68 POTTER & JOHNSTON Auto. Lathes

MISCELLANEOUS
15" BETTS Vertical Slotter
1/2 B P&W 2-spindle Reaming Machine
4" TAYLOR & FENN Spline Miller
6" P&W Upright Shaving Machine
24" x 24" 6" GRAY Double Housing Planer, 1941
38" MORTON Draw Cut Shapers, 1945

Wigglesworth Industrial Corp.
193 Bent Street, Cambridge 41, Mass.

BORING MILL—84" (New)
BORING MILL—200" (New)
DRILLS, Radial—4", 5", 6", up (New)
FURNACE (2)—Tocco, Jr. 20KW, 2 Sta.
FURNACE—Roller Hearth,
I.D. 15'8" x 3'6" x 11"
GUN BORING LATHE—64" x 65'0"
LATHE—32" x 21" c/c Bridgeford G.H.
MILLER VERT.—28" x 72" and
36" x 118" (New)
PRESS—2000 Ton, Knuckle Joint
PRESS—Plate Bending, 2000 Ton for forming cyl. shells, 14" W x 2 1/2" Thick
PRESSES—Hydraulic, 1000-4000 Tons
PRESSES—Hyd. 100-2800 Tons for 105 mm shells
RIVET HAMMER—6B Hi-Speed
STRAIGHTENING PRESS—2000 Tons (Plate)
NUT-TAPPERS—3/4", 6 Spindles (2)
UPSET & FORG. MACHINE—10"

MAXWELL MACHINERY CORP.
1775 Broadway New York 19, N. Y.
Plaza 7-3471

DO YOU HAVE A COIL PROBLEM?
We specialize in C.R. steel coils in the thinner gages, —from .020 to .002. Unsurpassed precision tolerance and uniformity of gage. What are your requirements?
METAL SUPPLIERS COMPANY
11 W. 42nd St., New York 36, N. Y. WI 7-6740

PERFORMANCE TESTED Machine Tools

Board Drop Hammers

Billings & Spencer 800 lb. and 2000 lb. Model "D"
Chambersburg 1200 lb., 1600 lb., 2000 lb. and 2400 lb.
Type "F"
United Engineering 3000 lb.—New ram

Miscellaneous

National 3" Upset Forging Machine—Stroke of head—ers 12"—Die space 17 1/2" x 20"—Work conveyor.

Bertsch 18" x 1 1/2" cap. Pyramid Bending Roll—100 HP main drive and 50 HP elevating motor—1944 machine—Excellent condition

Billings & Spencer #2 1/2 and Waterbury-Farrel #7 Straight Side Pillar Presses—Used as trimming presses for board drop hammer work.

Beatty No. 11B Heavy Duty Press—350 tons ram pressure—stroke 3"—MD—1945 machine

Cincinnati-Bickford 7" 22" Master Type Radial Drill—24 speed head—Box table—Straight base—AC MD

This is only a partial listing of our huge stock of Machine Tools of every Make and Description.



Send for our free catalog "The Plant That Answers 1001 Machine Tool Problems."

**America's Foremost
Machine Tool Rebuilders**

**Botwink Brothers
of Mass., Inc.**

5 SHERMAN ST., WORCESTER, MASS.

1—Mackintosh-Hemphill Alligator Shear, cap. 2 1/2" squares or 1" x 8" HRS.

2—Salem Gas fired annealing furnaces, 24" x 24" x 26" long, 21" wide wire mesh conveyor, complete with all equipment.

2—Morgan Gas Producers, 10' 6" internal diam. cap. 4000# coal per hour, crusher & coal hoist included.

1—200 ton Baldwin-Southwark Forging Press, hydraulic, 18" cylinder x 8' 6" stroke.

Lou F. Kinderman

Box 182 - Niles, Ohio - Phone 2-2589

**KNOX
REBUILT
AIR COMPRESSORS
FULLY GUARANTEED**

EARLE E. KNOX COMPANY
1111 BACON STREET ERIE, PA.

COMPRESSORS and VACUUM PUMPS
NEW and GUARANTEED REBUILTS

Electric - Steam - Gas - Diesel

SALE • RENT • BUY

Since 1902

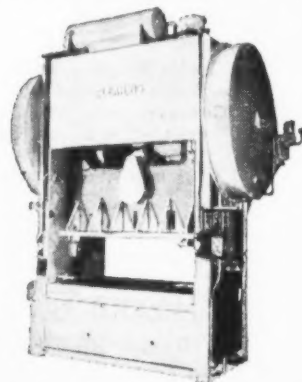
AMERICAN AIR COMPRESSOR CORP.

DELL AVENUE & 48th STREET • NORTH BERGEN, N. J.

Telephone Office 5-4848

WORLD'S LARGEST STOCK STAMPING PRESSES

BLISS • CLEARING • CLEVELAND
FERRACUTE • HAMILTON • L & J
NIAGARA • TOLEDO • V & O



**SQUARING SHEARS • PRESS BRAKES
REBUILT and GUARANTEED**

JOSEPH HYMAN & SONS

710GA. LIVINGSTON & ALMOND STS.

PHILADELPHIA 34, PA. Phone REGENT 9-7727

USED FORGE SHOP EQUIPMENT

HAMMERS

500, 600, 800, 1200, 1600# B&S, B. D.
800# Chambersburg Single Frame
1400# Chambersburg B. D. Model F
2000# Lane Steam Drop, 48" bet. guides
1100# N.B.P. Single Frame
2000# N.B.P. Single Frame
50# Bradley Upright Strap
300# Bradley Upright Helve

TRIMMING PRESSES

1—#73 Bliss Consolidated OBI, MD, 40 Ton
1—#55 1/2 Toledo, SS, MD, 98 Ton
1—#56 Toledo, SS, MD, 113 Ton
1—Chambersburg, SS, MD, 150 Ton
1—#7 Hillas & Jones Guillotine Bar Shear

All Presses rebuilt and guaranteed

MISCELLANEOUS

2000# Clark Low Lift Platform Truck
2000# Clark High Lift Platform Truck
2000# Automatic Low Lift Truck
2000# Mobilift Fork Lift Truck
#60 W-F Special Long Thread Roller
#11 W-F D.S.S.D. Cold Header
42" Newton Cold Saw, Extra Blade
Parts for 3000# Erie & Chambersburg
28 x 80 Hydrotel Type Vertical Mill
#12 B&S Production Mill, 12 x 60" (2)

Wilkie Die Products Company

Specialists in Forge Shop Equipment
1182 Hawthorne, Grosse-Pointe 30, Mich.
Phone—Detroit TUzedo 4-2621

48" x 1 1/4" LEWIS PLATE SHEAR

Holddown

Motor Drive With 40 H.P.

220/3/60 Cycle Motor

LANG MACHINERY COMPANY

28th St. & A.V.R.R. Pittsburgh 22, Pa.

FOR SALE

1 Economy No. 112F Mechanical Briquetting Machine

SIPI METALS CORP.

1720 North Elston Avenue Chicago 22, Illinois

TURBO COMPRESSOR

We offer Lamson Turbo Compressor 2000 CFM, 16 oz. pressure, in first class condition, with 15 HP GE Type K Motor 3/60/220 volt, 1750 RPM and Cutler Hammer Control.

Northern Equipment & Supply Co.
Sault Ste. Marie, Ont., Can.

THE CLEARING HOUSE

RE-NU-BILT GUARANTEED ELECTRIC POWER EQUIPMENT

D.C. MOTORS					
Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1750	Whae.		600	550/700
1	1500	Whae.		525	500
1	940	Whae.		250	140/170
1	800	Al. Ch.		250	100/900
1	500	Whae.	CC-210	600	300/900
2	450	Whae.		550	415
1	400	G.E.	MCF	550	300/1050
1	350	Cr. Wh.	CCM-151H	230	1100
1	335	Whae.	MQ	250	300/900
1	300/300	G.E.	MFC	230	350/920
1	200	Rel.	1970T	230	720
1	150	G.E.	65H	600	250/750
1	150	Cr. Wh.	88H-TEFC	230	1150
10	150	Cr. Wh.	88H-TEFC	230	900
1	150	Whae.	8K151B	230	900/1800
1	150	Whae.	8K-201	230	360/950
1	50/120	G.E.	MCF	230	250/1000
2	100	Whae.	8K-181	230	450/1000
1	100	G.E.	CD-175	230	365/730
1	100	G.E.	CDP-115	230	1750

MILL & CRANE

1	50	G.E.	CO-1810	230	735
1	33	Whae.	K-8	230	505
2	30	G.E.	MD-104AA	230	700
1	30	Whae.	K-5	230	975
1	18	Whae.	K-5	230	600
1	10	C.W.	SCM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
1	6.35	Whae.	K-8	230	680
4	3	C.W.	SCM-FF	230	1750
2	3	Whae.	HK-2	230	835
1	3/4	Whae.	K-1	230	935

A.C. MOTORS 3 phase—60 cycle SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1800	G.E.	MT-498	2300	360
1	1500	ABH	MP	2300	720
1	1300	G.E.	MP	2300	375
1	500	Whae.	CW	550	350
1	500	G.E.	IM	440	900
1	500	G.E.	M-574-Y	6000	900
1	500	G.E.	IP	550	505
1	400	Whae.	CW	440	514
1	350	G.E.	MT-442Y	2200/4000	252
1	300	Al. Ch.		440	505
1	250	G.E.	MT-424-Y	2200	1800
1	250	G.E.	MT-5398	550	600
1	200	Cr. Wh.	20QB	440	500
2	200	G.E.	IM17	550	585
2	200	G.E.	IM-17	440	400
1	200	G.E.	IM	440	435
1	200	G.E.	MTF	440	1170
1	150 (unused)	Whae.	CW	2300	435
1	125	Al. Ch.		440	720
4	125	G.E.	MT-504Y	440/2200	435
4	100	G.E.	IM	440	600
1	100	A.C.	ANY	440	695
1	100	G.E.	IM-16	2300	485
1	100	Whae.	CW-808A	440	700

SQUIRREL CAGE

3	600	G.E.	PT-550BY	440	3570
3	450	Whae.	CS-1420	3800/4150	354
1	400	Al. Ch.		2200	885
1	300	G.E.	IK-17	440	280
1	200	G.E.	IK	440	865
1	200	G.E.	KT-557	440	1800
1	150	Whae.	CR-8568	440	880
1	150	Whae.	CR	440	280
1	150/75	G.E.	IK	440	900/450
1	125	Al. Ch.	ARW	2200	1750
1	125	G.E.	KP-6528-Z	440/2200	8585
1	125	Whae.	MR	440	485

SYNCHRONOUS

3	3500	G.E.	TS	2300	257
2	2100	G.E.	ATI	2300	300
2	1750	G.E.	ATI	2300	3000
2	2000	Whae.		2300	120
1	735	G.E.	ATI	2300/12000	600
1	450	Whae.		2300	450
3	350	G.E.	TS	2300	150

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
3	2000	G.E.	500	600	11000*
1	1500	G.E.	514	600	6600/12500
1	1500	G.E.	514	250	6600/12500
1	1500	G.E.	720	600	6600/12500
1	1500	G.E.	360	375	4400
1	1500	Whae.	600	600	4160
2	1000	Whae.	900	600	4180
1	1000	G.E.	900	360	4600
1	1000 (BU)	G.E.	900	350	3300
1	750	Whae.	900	275	4180
1	750	G.E.	780	135	2500
1	500	Whae.	900	125/250	440
1	500	Whae.	900	250	6600/12500
1	500	Whae.	1200	125/250	2300
1	400 (BU)	Cr. Wh.	1200	125/250	2300
1	300	G.E.	900	125	2300/4160
1	300	Al. Ch.	1200	125/250	2300
1	150	Whae.	1200	275	2900
1	140 (BU)	Cr. Wh.	600	125/250	440/2300
1	100	Delec	1200	130/240	2300
1	100	G.E.	1170	135	220/440

FREQUENCY CHANGER SETS

Qu.	K.W.	Make	Freq.	Volts
1	3000	G.E.	25/60	2300/2300/4000
1	2000	G.E.	25/62.5	2300/2300
1	1000	G.E.	25/58.3	4400/2300
1	800	Al. Ch.	25/60	11000/2300

MILES' QUALITY

AUTOMATICS, 00G Brown & Sharpe
AUTOMATIC, 8" Bullard Mult-Au-Matic, 6-spindle
AUTOMATIC, 6-spindle Baird chucker
BORING MILL, 4" Detrick & Harvey, horizontal,
floor type
BORING MILL, 61" Bullard Maximill
BORING MILLS, Two No. 5D Moline, 6-spindle
cylinder boring
BROACH, No. 1 Foote Burt duplex surface
BROACH, 2-ton American horizontal hydraulic
BROACH, V42 American hydraulic, 18 ton
BROACH, 12-ton VU 12 LaPointe vertical hydraulic
34" stroke, new 1948
BULLDOZER, No. 22 Williams & White
DRILL, No. 310 Baker, heavy duty
DRILL, 24" Cincinnati upright
DRILL, 24" No. 25 Foote Burt
DRILL, 12-spindle No. 12 Natco
DRILL, 12-spindle No. 10 DeFiance rail type
DRILL, 36-spindle Bausch, adjustable spindle
GEAR HOBBER, No. 12H G&E
GEAR HOBBER, No. 130 Cleveland Rigidhobber
GEAR HOBBER, No. 3 Adams Farwell
GEAR HOBBER, No. 12 Barber-Colman
GEAR HOBBER, Nos. 1 and 25 5A Lees Bradner
HONE, Nos. 172 & 263.0 Barnes hydraulic
GEAR SHAFER, 8"-12" Red Ring
GRINDERS, CENTERLESS, Two No. 2 Cincinnati,
with pressure lubrication
GRINDER, 6"x30" Cincinnati, type ER, in feed
GRINDERS, CYLINDRICAL, 10x18 Norton with
hydraulic quick infeed
GRINDER, CYLINDRICAL, 12"x36" Bath universal
GRINDERS, INTERNAL, Nos. 16-28 and 24-36
Bryant
GRINDERS, INTERNAL, Nos. 72A3 and 72A5
Head
GRINDERS, SURFACE, 12" and 16" No. 22 Healds
GRINDER, THREAD, late No. 33 Excella, now ar-
ranged for groove grinding
HAMMER, Nos. 5N & 6B Hazel pneumatic
HAMMER, 40 lb. Bradley helve
LATHE, TURRET, No. 5 Acme universal
LATHE, TURRET, No. 6 W&S, G. H. motor-in-base
MILLERS, Two No. 2 Cincinnati plain
MILLERS, Nos. 1, 2 and 3 Kent Owens hand
MILLER, 18" Cincinnati automatic
MILLER, 24" Cincinnati automatic duplex
MILLER, type 45 Product-O-Matic
MILLER, 30 1/2" x 21" x 12" Ingersoll 4-spindle
planer type
MILLER, 48" x 20" x 20" Ingersoll planer type,
3 vertical heads
MILLER, 48" x 36" x 12" Ingersoll planer type,
adj. rail
MILLER, 84" Ingersoll 6-spindle rotary continuous
MILLER, THREAD, Type C Hall planetary
MILLER, THREAD, Nos. 4, 6 and CT 36 Lees
Bradner
PLANER, 28"x28"x8" Gray Double housing one head
PLANER, 36"x36"x8" Cleveland onspindle
PLANER, 48"x48"x12" Gray
PRESSES, Nos. P01, P1, P2, P3, P4A, p5 and
CA4 Ferracuta
PRESS, 50 ton Warco OBI, 1947
PRESS, No. 61 Cleveland OBI
PRESSES, No. 56 1/2, 57 1/2 and 77 1/2 Bliss s.s.
trimming
PRESS, No. 245 1/2 Hamilton s.s. tiered frame
PRESS, No. EG54 Ferracuta knuckle joint
PRESS, 800 ton No. 665 Toledo knuckle-joint coining
PRESS, No. DAB411 Hamilton double action toggle
draw
PRESS, 100 ton HPM hydraulic
RIVETERS, large variety
SLOTTER, 16" Bement Miles crank
SAWS, Three 816S Kalamazoo metal cutting band,
new
SAW, 7" No. 14 Hingley cold-cutting
SAWS, three L-W (Toledo) power hack, new
SHAPER, 27" Norton draw cut
SHEAR, 38" throat No. 17F New Duty
STRAIGHTENER, No. 0 Sutton for bars
TAPPER, 3 1/2" Bausch lead screw, radial
TAPPERS, Two No. 71 Etice
TAPPER, 19" Hammond sensitive drilling & tapping
TESTER, 230,000 inch-pound Tinius-Olsen No. 2
torsion
THREADERS, 2" Landis pipe threading and cutting
THREADERS, Two 3 1/2" Landis, double spindle
THREADERS, 2" Oster rotary head
UPSETTER, 3" National air clutch
UPSETTERS, Two 4" Ajax heavy duty, twin-gear
WELDER, 200 KVA Federal flash butt
WELDER, 100 KVA Thompson automatic spot
WELDERS, 12" and 14", 12 KVA American Elec-
tric Fusion Co. spot

WRITE FOR CATALOG NO. 193 FOR COMPLETE LISTING

MILES MACHINERY CO.

2025 E. Genesee Ave.
SAGINAW, MICHIGAN

43rd YEAR — 43rd YEAR MOTORS & GENERATORS, etc. 1 YEAR GUARANTEE

Partial Listing Only!

GENERATORS—250 V. D.C. Motor Driven

KW	Make	Type	Speed
1000	Al. Ch.	CTD	720
250	Cr. Wh.	CTD	1200
150	West.	SK	900
125	G.E. (2)	MPC	1200
100	Delec		1150
75	Cr. Wh.	51H	1150
50	Cr. Wh.	51H	1150
40	West.	SK	1750
35	G.E.	RC	1750
35	Al. Ch. (4)	3 wire	1750
25	G. E.	CS	1200
15	Star		1750
7 1/2	West.	SK-43	1750
5	West.	SK-384	1750
5	Rel.	T-23T	1750
5	Rel.	T-14T	1740

GENERATORS—Low Voltage D.C.

Amp.	Make	Volts
10,000	H-V-W	6
10,000	J-L	10
6000	El. Prod.	18/26
5000	H-V-W	4/12
4000	G. E.	7 1/2
3000	North.	1 1/2
2500	Chandey.	6/12
1500	Chandey.	6/12
750	H-V-W	6/12
1000	West.	15
1000	G. E.	25
1000	West.	24
100	Diehl	32
200	West.	35
125	Burke	35
500	G. E.	40
1000	Chandey.	32
1500	Century	40
2200	G. E.	45
325	West.	50
1000	G. E.	80

230 V. D.C. MOTORS

H.P.	Make	Type	Speed
250/200	Rel.	200T	400/800
200/130	Cr. Wh.	CMC-125H	450/900
187 1/2	West.	MD-8-418AR	485
150	West.	SK	1150
150	West.	SK	850
150	G. E.	LC	1750
125	Rel.	T	600
125/50	E. D.	20-SL	1750/1315
100	West. (4)	SK	1150
100	West. (6)	SK	850
100	Rel.	651-T	850
100	G. E.	RC	600
100	Rel.	1000-T	500
100	A-C		1150
100	F.M.	TRC-38	225
110/55	G. E.	DMC	800/400
90/45	G. E. (2)	RF-17	950/475
75	G. E.	CD-155	1150
75	West. (6)	SK	1150
75	G. E.	RC	1200
75	Rel.	461-T	850
75	West. (2)	SK	850
75	West.	CMC-125H	475
75	Cr. Wh.	CMC-125H	875/950
60	West.	SK	850
60	West.	SK-160	880
60	West.	SK	250/1000
50	Cr. Wh.	CMC-FH	1750
50	Cr. Wh.	CMC-CH	1150/1750
50	G. E.	CD-93	850
50	West.	SK-160	880
50	G. E.	RF-17	250/1000
45	G. E. (3)	CD-105	850
40	Cr. Wh.	FD	1750
40	West. (5)	SK	775
40	Rel.	461T	400/1200
35	E-D	258	250/1050
35	West.	SK	250/1050
35	West.	SK	1150

SLIPRING MOTORS

H.P.	Make	Type	Speed
600	Cr. Wh.	131-AQ	907
500	Elud.	EPKOR	1180
500	G. E. (2)	IM	450
400	G. E.	IM-17B	870
250	G. E.	IM-17B	450
200	G. E.	MT-550Y	1175
150	G. E.	IM	870
125	West.	CW	1750
125	G. E.	IM	580
100	G. E.	MT-347	1150
100	G. E.	IM	690

SQUIRREL CAGE MOTORS

H.P.	Make	Type	Speed
250	GE (TENV)	K-6335	1750
200	Wagner	RP2-26Z	1800
200	West.		1750
200	Al. Ch.	AR	885
200	G. E.	KF-6335	880
150	West.		1175
150	G. E.	IK	580
125	A. Ch. (2)	53R	3500
125	A. Ch. (5)	AR	1800
125	Century		3500
100	A. Ch.		690
100	West.	CS607H	3540
100	G. E.	1EK	1800
100	West.	CS	870

Please Send Us Your Inquiries

L. J. LAND, INC.

Established 1910

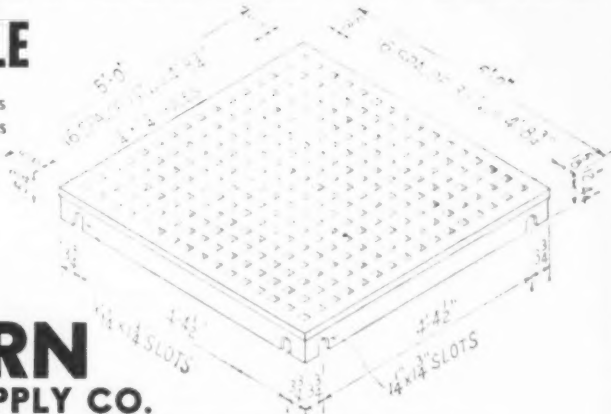
THE CLEARING HOUSE

BENDING BLOCKS or SLABS FOR SALE

These blocks or slabs are 5 ft. x 5 ft. as shown. They are very useful for many purposes such as for bending tables, layout, welding and assembly-work, etc.

**ACORN
IRON & SUPPLY CO.**

Delaware Avenue at Poplar Street, Philadelphia 23, Pa.



15 TON HEROULT ELECTRIC FURNACE

Manufactured by American Bridge Co., with side charge. Complete with 5000 KVA Westinghouse Transformer, Reactor, Winches, Masts and Motor. Furnace match-marked and tagged for erection. All parts are in excellent operating condition. Immediate Shipment.

For inspection, contact—

HEAT & POWER CO., INC.

70 PINE ST. HANOVER 2-4890 NEW YORK 5

Domestic STEEL SHEET

Conversion Material Free from CMP

Cold Rolled Domestic Quality

Good Deliveries 4th Qtr. 1952, 1st Qtr. 1953

Address your inquiries to:

A. W. SUTTER COMPANY

141 East 44th Street

New York 17, N. Y.

1—10' Betts Vertical Boring Mill, 2 heads A.C. motor drive.
4'11" Cincinnati-Bickford Radial Drill gear box, pulley drive.
3'9" Cincinnati-Bickford Radial Drill, gear box, motor driven.
36" x 36" x 14' Cincinnati Planer, 3 heads, belted motor drive.
48" x 16' Gleason Engine Lathe, motorized, 7' centers.
#3 Cincinnati H. P. Plain Miller, motor drive, table 13' x 50'.

CLARENCE J. O'BRIEN

1032 Commercial Trust Bldg., Phila., 2, Pa.

Phone RI-6-5467

Flexible Rubber Hose Assemblies

For Machine Tools and Equipment of Every Make and Description

VARI-PURPOSE HOSE ASSEMBLIES

HYDRAULIC HOSE ASSEMBLIES

PAINT SPRAY & AIR HOSE ASSEMBLIES

LUBRICATION HOSE ASSEMBLIES

For use with the following:

Acids	Gasoline	Paint
Air	Grease	Pneumatic
Acetylene	Grinding Oil	Solvents
Beverages	Hydraulic	Spray
Chemicals	Lacquer	Steam
Cutting Oil	Lubrication	Thinners
Distillates	Oil	Water
Fuel Oil	Oxygen	Welding

Deliveries Immediately from Stock!

COMPLETE CATALOG
AVAILABLE UPON REQUEST

CARLYLE RUBBER CO., INC.

64 PARK PLACE NEW YORK CITY 7, N. Y.

BULLARD

54" SPIRAL DRIVE

VERTICAL TURRET LATHE

SERIAL 23000

NEW 1944

PRACTICALLY NEW

IMMEDIATE DELIVERY

**O'CONNELL
MACHINERY CO.**

Tel: BAILEY 5800

1693 GENESEE ST. BUFFALO 11, N.Y.

MODERN PRODUCTION EQUIPMENT for STEEL KITCHENS

Complete equipment for producing steel kitchens now available at 1/2 replacement cost. All modern, in good condition.

Includes dies, cleaning and spraying equipment, ovens, shears, brakes, presses, welding equipment and conveyors.

Factory now in operation. Can be inspected by appointment with owner. Delivery can be arranged by late 1952.

ADDRESS BOX S-836

Care The Iron Age, 100 E. 42nd St., New York 17

FURNACE TRANSFORMER

3000 KVA—Westinghouse, H.T. 26400/13200V., LT—200/150V. and 115/87V. 3 ph. 60 cy. with 345 KVA H.T. Reactor; Motor operated H.T.—O.C.B. and 2-37K.V.—160/80—Samp. C.T.S.

BELYEA COMPANY, INC.

47 Howell St.

Jersey City 6, N. J.

Immediately Available WIRE WORKING MACHINERY

FOURSLIDES: Baird, Nilson & Manville, Nos. 0, 1, 2, 3, 4, 5, 3-20, 4-26
U. S. Tool Co. No. 22, 28, & 33 Multislides
Sleeper & Hartley Spring Coilers Nos. 0, 1, 2, 3, 3 1/2, 4, & 5
Vaughn Nos. 8, 10, & 12 Moto-Blocs
Waterbury No. 3 Bull Blocks, Duplex
Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive and motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines

PARTIAL STOCK LISTING

"The most diversified stock of machinery in the country. If it's machinery we have it."

NATIONAL MACHINERY EXCHANGE

128 Mott St., New York 13, N. Y.
CAnal 6-2470

FOR SALE

1 Detroit Electric Furnace, type CC-600 K.W. 3000 lb. capacity. Two linings. Two shells. New. Original crate. No transformer.

Price \$14,500.00

ADDRESS BOX S-835

Care The Iron Age, 100 E. 42nd St., New York 17

ELECTRIC FURNACE to 1850°

8 x 12 x 15 Inside with Auto. Temperature Control 4.5 K.W. Sliding door, cheap to operate. Substantial. Dependable for Machine Shop—Tool Room. New. \$250.

E. H. WILLIAMS, Box 9042

Huntington, W. Va.

FOR SALE

Steam Locomotive Crane 25 ton Standard gage M.C.B. 80' Boom Generator set for magnet and lights just overhauled.
Used Electric Gantry Whirley Revolving Crane 18' track gage, 100' Boom self-propelling. 3-phase, 60 cycle, 220-440 Volts. Now running.

ADDRESS BOX S-853

Care The Iron Age, 100 E. 42nd St., New York 17

THE CLEARING HOUSE

LATE TYPE MACHINERY

AUTOMATIC, 1 1/4" — 4 Spin, Gridley Model G
BOLT TREADER, 2" Landis, 2 inds., M.D. (2)
BOLT TREADER, 1 1/2" Reliance Williams
VERT. Attach. for Boring Mach. for 330T G. & L.
Mill & Outer Support
BORING MACH., 3" Bar, Betts Floor Type
BORING MACHINE, 3" Bar Lucas, Table Type
BORING MACH., 3" Bar, Lambert Table Type, M.D.
BORING MILL, 100" Cmel. Heavy, 2 Heads, M.D.
BORING MILL, 7 1/2" King, 2 Hds., M.D.
RADIAL DRILL, 4" 11" Col. Cmel. Birk., M.D.
RADIAL DRILL TABLES, 36" x 20" x 20" (19)
RADIAL DRILL, 6" 1 1/2" col. Amer., M-on-Arm
RADIAL DRILL, 5" 15" col. Amer., M-on-Arm, Trl.
rup.
RADIAL DRILL, 5" 14" Col. Amer., M.D.
RADIAL DRILL, 5" Niles, No. 10, M-on-Arm, Late
RADIAL DRILL, 4" Western, M.D. (2)
RADIAL DRILL, 3 1/2" Morris, 9 1/2" col. Gear Box
M.D.
RADIAL DRILLS, 3" 8" & 2 1/2" (New)
DRILL, 24" Cmel. Birk., Tapping
DRILL, No. Ds Colburn 36" 5" capty.
DRILL, No. 314 Baker, 24" 3" capty.
GEAR CUTTER, No. 13, B. & S. Spur & Bevel
GEAR PLANNER, 1" Reinecker, Bevel, A.C., M.D.
GEAR SHAPERS, Nos. 6 & 75 Fellows
GEAR SHAPER, Nos. 61A, 64A & 64 Fellows, 1945
GRINDERS, C.V., 16" x 48" Cmel., M.D.
GRINDERS, FACE, 84" Builders, 32" wheel
GRINDER, SURFACE, 14" P. & W. Vert. Spia. B.B.
GRINDER, UNIV., 12" x 30" Thompson, M.D.
GRINDER, Micro Int. M.D.
GRINDER, No. 6-T Sellers Tool, 42"
KEYSEATER, No. 3 1/2" Baker, 26" x 4" capty.
LATHE, 60" x 45" cen. Mackintosh-Hemphill, 1942
LATHE, 36" x 20" cen. Putnam, 2 car., T.A.
LATHE, 32" x 14" S. & S., M.D., T.A.
LATHE, 26" x 48" x 24" Bed. McCabe, Dbl. Spia.
LATHE, 25" x 12" Bed. B & E., T.A., Grd. Hd.
LATHE, 20" x 78" Maitre, T.A., New
LATHE, 18" x 8" Bed. L. & S. Select Grd. Hd., M.D.
LATHE, 14" x 30" Cen. Monarch, M.D.
TURRET LATHE, 21" Acme Univ., Brass, Late
TURRET LATHE, No. 18 Foster, Univ. 2" capty. (2)
TURRET LATHE, No. 28 Foster, Univ. 3 1/2" capty.
TURRET LATHE, No. 3 AL Gisholt, 6 1/2" M. S.
TURRET LATHE, No. 3 Gisholt, Bar & Chuck
THREAD MILLER, 12" x 60" Morey Shield, 43
MILLER, Abene (like Van Norman) New
MILLER, No. 000 B. & S. Plain, M.D. Late
MILLER, No. 0 Sundstrand Rigidmill Hand
MILLER, No. 2 Van Norman, Duplex, M.D.
MILLERS, No. 3 Cincinnati, Motorized
MILLER, No. 4 Cincinnati, High Power Universal
MILLER, No. 22 L. Van Norman Ram Type
MILLER, UNIV., Nos. 3 & 2 Cincinnati
MILLER, UNIV., No. 1 1/2 B Special K. & T. M.D.
MILLER, VERT., No. 5 Reed Prentice, 42"
PIPE THREADER, 2" Landis A.C., M.D.
PLANNER, FROG & SWITCH, 42" x 18" x 18" N.B.P.
PLANNER, PLATE, 30" x 1" Cleveland, M.D.
PLANNER, 36" x 36" x 14" Whitcomb, 2 Hds., M.D.
PRESS, Hydr., 200 Ton, Sectional Flanging
PRESS, No. 715, Bliss S.S., 6" Stroke, 70 ton capty.
PRESS, No. 58, Toledo S.S., Grd., 171 Ton capty.
SHAPER, 36" Merton Draw Cut
SHAPERS, 32" 20" x 16" Gould & Eberhardt
SHAPER, 24" Gemco "Kelly" Univ. Tble., 42"



BENNETT MACHINERY CO.

375 Allwood Rd., Clifton, New Jersey

Phone: PRescott 9-8996 N. Y. Phone LOnacre 3-1222

PRESSES

#407-A BLISS, Double Action, Toggle, 18" draw stroke, 60" bed.

500 TON CLEARING, Hydraulic, 20" stroke, 40" bed.

125 TON BLISS, Double Crank, 14" stroke, 83" bed.

100 TON HENRY & WRIGHT, High Speed, Double Roll Feed, Scrap Cutter.

#305 BLISS, Single Crank, Tie-Rod, Geared, 6" stroke.

HYMAN

PRESS SALES CORP.
225 LAFAYETTE ST.
NEW YORK 12, N. Y.
BARclay 7-4430

For sale two Milwaukee Model BL #350 Hydraulic Bricquetting Presses, for turnings or borings, in very slightly used condition. Price \$20,000.00 each F.O.B. cars, shipping point.

ADDRESS BOX 8-A02
Care The Iron Age, 100 E. 42nd St., New York 17

ALWAYS YOUR BEST SOURCE

STAINLESS STEEL

TOOL STEEL

- SHEETS
- PLATES
- BARS
- TUBING
- COILS
- Nationally Known Brands
- High Speed
- High Carbon—High Chrome
- Oil, Water & Air Hardening

Many items below warehouse prices. Immediate delivery.

Complete warehouse facilities.

Eastern METALS CORP.

72 Lockwood St., Newark 5, N. J.

FOR SALE

We can make immediate delivery from our warehouse of HOT WORK DIE STEEL—TOOL STEEL—SPECIAL STEELS. All standard recognized brand names—guaranteed quality!!

HOT WORK DIE ROUNDS

SIZE	TRADE NAME	WEIGHT
7"	Pressurized #3	77100#
5 1/4"	Hot Form	48900#
5 1/4"	#883 Carpenter	2875#
5 3/16"	"HWD"	33600#
4 1/2"	Pressurized #2	4658#
4 1/4"	"Shell Die"	16250#
4 1/4"	"HWD"	9000#
4 1/8"	"Shell Die"	2400#
4"	Pressurized #2	9000#
4"	"LPD"	5800#
4"	"Chro-Mow"	3100#
4"	"H.W.D."	445#
4"	Pressurized #2	455#
3 1/2"	"Shell Die"	4296#
3 1/2"	"Chro-Mow"	28577#
3 1/2"	"TCM"	33200#
3 1/2"	"LPD"	20000#
3 1/2"	"DC-33" Kloster	18700#
3 1/2"	"Hot Form"	13100#
3 1/2"	Pressurized #2	11700#
3 1/2"	"Shell Die"	8728#
3 1/2"	"Air Kool"	1293#
3 1/2"	"Fire Die"	1190#
2 5/8"	"TCM"	1260#

HOT WORK DIE SQUARE

8 1/2" x 8 1/2" x 84" Halcomb #218 40000#

SPECIAL!! "Magic" Chisel Steel (Jesop)—9/16" RD.—C.D.—45000#

NOTE: We have large stocks of SAE 1095 (H.R.) Tool Shank Steel in Squares & Rectangles.

GLOBE TRADING COMPANY

1815 FRANKLIN ST. All Phones WO. 1-8277 DETROIT (7), MICHIGAN

TOOL STEEL (WATER H.) ROUNDS

SIZE	TRADE NAME	WEIGHT
5 3/4"	"CFS"	17700#
5 1/2"	SAE 1095	2800#
5 1/4"	SAE 1095	1290#
4 1/2"	SAE 1095	328#
4 1/4"	"CFS"	4093#
3 3/4"	SAE 1095	385#
2 1/4"	SAE 1095	270#
2 1/16"	SAE 1095	5700#
2"	Vulcan Spec.	8735#
1 15/16"	SAE 1095	140#
1 7/8"	SAE 1095	3100#
1 11/16"	SAE 1095	20000#
.655"	SAE 1095-CD	28500#

TOOL STEEL (OIL H.) ROUNDS

SIZE	TRADE NAME	WEIGHT
6 1/4"	"Kefos"	12900#
4 1/8"	CRU.DBL/Spec.	14690#
4"	"Vibro"	37300#
3"	"K.W." Carpenter	24000#
1 1/2"	CRU.DBL/Spec.	2140#
7/8"	"SKF" 711	13400#
7/16"	"SKF" 711	1900#

OIL HARD. SQ. & RECT.

SIZE	WEIGHT
1 3/4" x 2" x 120"—"SKF 711"	6300#
1 3/4" x 1 3/4" x 120"—"Atlas 93"	10300#

WATER HARD RECT.

SIZE	WEIGHT
1 3/4" x 1" x 120"—"Silver Star"	33000#
1 1/2" x 1" x 120"—"Columbia"	1700#

Heald No. 72 Internal Grinder, M.D.
Fnote-Burt 3-way Drill.
30" P & W 2-spin. Vert. Profiler.
Laidlaw 30" Type CMT Metal Band Saw.

D. E. DONY MACHINERY CO.
47 Laurelfon Road Rochester 9, N. Y.

NEW RADIAL DRILL

4" x 12" Rd. Column • No Priority • 2 motors and Coolant • Auxiliary Table • 18 speeds up to 1100 R.P.M. • Price...\$7750 • Rocco—Made in Italy • Spot Delivery.

KINGS COUNTY MACHINERY EXCHANGE
408 Atlantic Ave. Brooklyn 17, N. Y.
Deot. "11" Phone: Triangle 5-6237

THE CLEARING HOUSE

FOR SALE

and Immediate Delivery

Hot Rolled, Unannealed
STEEL BARS
S.A.E. 9850

15 ton* of 1 1/4" ROUND

20 ton* of 1 1/2" ROUND

5 ton* of 1 3/4" ROUND

*approximate

Attractive offer takes it all

ROCK BIT SALES & SERVICE CO.

2514 E. Cumberland St.

Philadelphia 25, Pa.

Telephone—NEbraska 4-8100

FOR SALE

Overhead Electric D. C.
Traveling Cranes

2—25 ton 50' span
Cab Controlled

720' Crane runway 36"
Beams and 75 lb. Rails

1—10 ton Whiting 40' A.C.
span floor controlled

ADDRESS BOX S-854

Care The Iron Age, 100 E. 42nd St., New York 17

FOR SALE

10000' 2" IPS. New Seamless Steel Tubing
Hot Finish ASTM A-83 20/22'
12500# .060 Rd. Brt. Basic Wire Soft coils
14000# .060 Rd. Brt. Basic Wire 1/2 Hd coils
2000 # .070 Rd. Brt. Basic Wire Soft coils
2000 # .120 Rd. Brt. Basic Wire 1/2 Hd coils
18000# .080 Sq. Extra Brt. Basic Wire Soft coils

Send for our Steel & Machinery Lists
Seaboard Steel Company, Inc.
New Haven, Conn.

Machine Tools for Toolroom & Production

NEW

Springfield Engine Lathes 14" x 54" c/w T.A.
Broadbeat 12 1/2" x 12" Gap Bed Geared Head Engine
Lathes
Kerry 8" & 8" Power Hacksaws

LATE TYPE

Model 420 Barnes Horizontal 43" Deep Hole 2-
spindle Drilling Machine
8-Model 90 New Britain Gridley 8-spindle Auto-
matic Screw Machines
3-American Engine Lathes, 24" x 4'
Model O-8 Cincinnati Vertical Milling Machine
20" x 6"
Model O and OO Sundstrand Rigmills

USED

Model 1F Foster Fastermatic Geared Head Turret
Lathes, 21" swing, 2-5/16" hole in spindle
No. 3L Gisholt Turret Lathes
3-Model 213 E 300 A 9 Progressive Rocker Arm
Spot Welder, 48" throat, 50 KVA, 3 Phase, 60 cycle,
550 Volt, for welding two pieces .064 aluminum

INTERNATIONAL MACHINERY COMPANY LTD.
73 ROBERT STREET HAMILTON, CANADA

PRESS BRAKES

10' x 3/16" CHICAGO DREIS-KRUMP
10' x 3/16" COLUMBIA

*Late Type
Excellent Condition*

WINSTON MACHINERY CO., INC.

326 WEST OHIO STREET
INDIANAPOLIS 2, INDIANA

40 ton SHAW BRIDGE CRANE

40 ton Shaw 34'6" span with 3/60/440 mtrs. cab
control. Can be inspected under power. Also
available with above crane a 20 ton extra
trolley.

ALLSTATES EQUIPMENT CO.
343 So. Dearborn St. Chicago 4, HI.
Phone: Harrison 7-1821

One DeLavernge
Diesel Oil Engine
260 h.p.

with all accessories

Apply FOX COMPANY

240 East 136th St., New York City
Phone MO 9-4211

PRESSURE VESSELS IMMEDIATELY AVAILABLE

13—10' ID dia. x 40' long x 2 1/2" to 3" shell.
Heads 3 1/2" to 3". WP 600 and 500 psi.
6—8' ID dia. x 40' x 2" to 2 1/2" shell. Heads
2 1/4". WP 500 psi.
1—6' ID dia. x 40' x 2" shell. Heads 2 1/4".
WP 300 psi. at 900°F.

All used, good condition, seam to seam lengths,
code welded construction. Built by A. O. Smith
Corp. Located near Chicago, Illinois. Prints,
prices available on request.

KINSLOW POWER & EQUIPMENT CO.
817 So. Boulder Tulsa 14, Oklahoma
Phone—55914

HAVE YOU TRIED THE CLEARING HOUSE?

*That "hard-to-find" machine for which you have been looking
may be listed in this very issue. Look through these pages now!*

For bargains in good used equipment, consult the Clearing House Section each week in

THE IRON AGE

THE CLEARING HOUSE

MOTORS - M. G. SETS - TRANSFORMERS

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SQUIRREL CAGE MOTORS

Qu	HP	Make	Type	Volts	RPM
1	400	Cont.	NZ-808	2300	1200
1	400	G.E.	1K	2200	514
1	400	G.E.	KT-412	2200	435
1	300	Whse.	CS-890	2300	1780
1	200	Whse.	CS-873C	2200	1160
1	200	Al. Ch.	AR	440/220	590
1	125	Al. Ch.	AR	2200	1750
1	125	Whse.	CS-701-C	440/220	1750
1	125	C.W.	126-Q	440/220	430
1	180	Whse.	CS-663C	440/220	1750
1	100	Al. Ch.	AR	550	890
1	100	P.M.	H241B	440/220	435
1	100	Whse.	CS-938	2200	495

SYNCHRONOUS MOTORS

Qu	HP	Make	P.F.	Volts	RPM
1	6000	G.E.	100	2300	90
1	3000	Whse.	80	4800/2400	720
2	2100	G.E.	100	2300	380
2	1750	G.E.	100	2300	3600
1	1000	EL. Mch.	100	440	1200
1	750	G.E.	80	2300	450
1	250	G.E.	80	2300	514
1	250	EL. Mch.	80	440	400
1	187	G.E.	80	220/440	720
1	150	G.E.	100	2200	900
1	150	G.E.	100	550	800
1	150	G.E.	80	550	450
1	135	G.E.	80	4000/2300	1200
1	125	EL. Mch.	100	4800/2400	900
1	135	G.E.	80	2200	900
1	100	Whse.	80	440	1800
1	100	Ideal	80	220/440	900
1	100	G.E.	80	220/440	600

MOTOR GENERATOR SETS

Qu	KW	Make	RPM	Volts DC	Volts AC
1	2400(3-U)	Al. Ch.	720	525	4800
1	2400(3-U)	Whse.	720	600	4800/2300
1	1000	G.E.	514	550	2300
2	500	C.W.	720	275	2300/440
1	500	C.W.	720	250	2300/440
1	500(3-U)	Whse.	1200	250	440
1	300	Al. Ch.	1200	250	2300
1	250	Whse.	1200	125	250
1	200	Whse.	1200	125	250
1	200	Ridgway	900	275	2200
1	155	G.E.	720	250	2300/440
1	150	G.E.	1200	500	2300/440
1	100	Al. Ch.	1200	125/250	4000/2300
1	100	Delco	1200	125/250	440/220
1	100	C.W.	1200	125	440/220
1	100	Ridgway	1200	275	4000/2300

Motor Generator Sets

complete with control
Still on their foundations
Available for immediate shipment
(3)-Whse. (4) G.E. 1000 K.W. 500 V.D.C. generators, spd. interpole, 514 RPM., 1440-HP. Syn. motors, 1000 V. 3 ph. 60 cy. (Will reconvert for 6600 volt)
(3)-G.E. 1500 K.W. 250 V.D.C. 514 RPM., Cpd. interpole, poleface windings, 2100-HP. Syn. motors, 8 P.F.—13200 V. 3 ph. 60 cy. (Will reconvert 6600 or 4160 v)
Priced right before Removal

CRANE AND MILL MOTORS

Qu	HP	Make	Type	RPM
1	265/300	G.E.	MDP-450	350/410
1	(Spare armature with anti-friction bearings for above)			
1	150/200	Whse.	MCB-100	370/300
1	100/140	Whse.	MCB-90	500/415
4*	100/140	G.E.	MDA-108	430/500

Qu	HP	Make	Type	RPM
2	100/140	G.E.	MDA-108	430/500
1	100	G.E.	CO-1831	300
1*	100	G.E.	CO-1831	875
1	75/100	Whse.	CK-10	500/475
1	75/80	Whse.	K-10	435/470
1	70/90	Whse.	MCA-70	440/400
2	70/90	Whse.	MCB-70	440/400
1	54/80	C.W.	FW	575/480
4	57/45	Whse.	K-9	470/515
2	65/85	G.E.	CO-1830-A	700/450
1	50/65	G.E.	C-1830-A	525/450
4	50	G.E.	CO-1810	725
2	50/65	Whse.	MCA-60	475/425
1	50	G.E.	CC-1829	750
3*	35	G.E.	CC-1828	875
1	35	G.E.	CO-1809	725
1	30/40	Whse.	MC-50	525/440
1	30	C.W.	EH	750
2*	16/19	C.W.	BW	620/580
6	10/15	Whse.	K-5	630/580
2	15/19	G.E.	CO-1807	450/575
1*	17	G.E.	MDA-103	700
2	15	G.E.	CO-1804	875
1	16/18	G.E.	MDR-406	615/700
1	13/17	G.E.	MDR-103	845/725
1	11/13	C.W.	A2V	1050/910
1*	10/13 1/2	Whse.	MCA-41	725/610
1	12	G.E.	MDA-102	875
3	10/13 1/2	G.E.	MDA-404	800/700
1	10	Whse.	CK-4	525
2	8 3/4	C.W.	AW	695/635
2	7 1/2/8 1/4	Whse.	K-3	135/480
1	7 1/2/10	G.E.	MDA-403	800/650
1	7 1/2/10	C.W.	SW-8-7 1/2	900/875
1	10/7	G.E.	MDR-102	800/1025
5	12/9	G.E.	MDA-102	875/725
1	10/7	G.E.	MDA-102	1025/800
1*	5/8 1/4	C.W.	RWS-5	1850/925
2*	5/6 1/2	G.E.	MDA-402	1925/925
1	5 1/4	Whse.	K-2	835
7	3 3/8	G.E.	CO-1803	875/700
9	3	G.E.	CO-1822	875

All motors SERIES except those marked (*) are COMPOUND.

ELECTRIC TRAVELING GANTRY CRANE

10-ton Champion 100' span between ground rails, 31' overhang one end, 23'9" other end, 45' lift, with 1200' of 100# rail. Now 550-VAC. will arrange for 220/440-VAC or 230-V.D.C. AVAILABLE FOR IMMEDIATE INSPECTION AND SHIPMENT. In excellent condition. The kind of crane that is seldom on the market.

T. B. MAC CABE COMPANY

4302 CLARISSA STREET

PHILADELPHIA 40, PENNA.

CABLE ADDRESS

"MACSTEEL" PHILADELPHIA, PA.

PHONE

DAVENPORT 4-8300

STAINLESS STEEL ROUND BARS

TYPE 303

Diameter	Weight
3/16"	500 lbs.
5/16"	620 lbs.
1/2"	500 lbs.
5/8"	228 lbs.
3/4"	517 lbs.
7/8"	251 lbs.
1"	1,000 lbs.
1 1/8"	878 lbs.
1 1/4"	23 lbs.
1 1/2"	23 lbs.
1 3/4"	12,000 lbs.
2"	944 lbs.
2 1/4"	210 lbs.
2 1/2"	4,403 lbs.
2 3/4"	2,964 lbs.
3"	2,157 lbs.
3 1/4"	2,400 lbs.
3 1/2"	219 lbs.

TYPE 304

Diameter	Weight
1/2"	500 lbs.
3/4"	1,000 lbs.
1"	200 lbs.
1 1/4"	620 lbs.

TYPE 309

Diameter	Weight
5/16"	600 lbs.

TYPE 321

Diameter	Weight
1"	10,000 lbs.

TYPE 347

Diameter	Weight
3/4"	1,002 lbs.
1"	200 lbs.
1 1/4"	1,210 lbs.

JANDRU STEEL CORP.

181 BRUCKNER BLVD., NEW YORK 54, N.Y.

PHONE: Cypress 2-5617

REBUILT GUARANTEED ELECTRICAL EQUIPMENT

KW	MAKE	RPM	D.O.	A.C.	HP	MAKE	RPM	TYPE
750	Al. Ch.-MG	720	250	2300	400	G.E.	450	Sl. Rg.
500	West.-Rotary	1200	250	2300	300	G.E.	450	Sl. Rg.
150 (2)	G.E.-Rotary	1200	250	13,200	150	G.E.	450	Syn.
400	West.-MG	720	550	2300	100	West.	900	Syn.
400	West.-Rotary	1200	125	2300	100	West.	1200	Se. Co.
400	West.-Rotary	1200	250	2300	100 (2)	G.E.	1750	Se. Co.
300	G.E.-MG	1200	250	2300	100 (2)	G.E.	450	Sl. Rg.
300	G.E.-Rotary	600	250	2300	75	West.	900	Se. Co.
300 (2)	West.-MG	1200	250	2300	60	West.	600	Sl. Rg.
300	G.E.-Rotary	1200	250	2300	50	G.E.	1750	Se. Co.
200	G.E.-MG	1200	250	2300	40	G.E.	900	Sl. Rg.
200	G.E.-MG	1200	125	2300	40	West.	900	Se. Co.
150	G.E.-MG	1200	250	2300	30	G.E.	1200	Se. Co.
150	G.E.-MG	900	250	2300				
100	Ridg.-MG	1200	250	2300				
35	G.E.-MG	1750	125	220/440				

MOORHEAD ELECTRICAL MACHINERY COMPANY

Office and Shop
Oakdale, Pa.

(Est. 1919)

Mailing Address
P.O. Box 7991-A Pittsburgh 16, Pa.

REBUILT AND NEW

GUARANTEED MOTORS

M.G. SETS • GENERATORS

Hoists • Compressors • Transformers
Units of Every Size and Description

WE'LL SELL, BUY OR TRADE

PHONE CANAL 6-2900



CHICAGO Electric Co.

1335 W. CERMAK ROAD
CHICAGO 8, ILL.

TRANSFORMERS

We can ship from stock
any required rating oil, air
or inerteen transformers
from 1 KVA to 6000 KVA.

P.S. Motors, Generators
and control

ELECTRIC EQUIPMENT CO.

Rochester, N. Y.

WORLD'S LARGEST INVENTORY

LOCOMOTIVES

- 4-100 TON G.E. DIESEL ELEC.
- 1- 65 TON G.E. DIESEL ELEC.
- 1- 65 TON WHITCOMB DIESEL ELEC.
- 1- 20 TON WHITCOMB GAS

DARIEN CORP., 60 E. 42nd St., N. Y. 17, N. Y.

THE CLEARING HOUSE

SINCE 1915 HEADQUARTERS FOR USED ROLLING MILLS AND STEEL WORKS EQUIPMENT

1—ROUGHING UNIT (FOR STRIP OR PLATE) consisting of reversing SLABBING MILL and 3-high PLATE MILL.
1—24" BILLEY MILL, 2-high, continuous, including 6 horizontal stands, 1 vertical edging stand and gear drive. Accessories include tables, cooling bed, and motor driven shear. Available at very low price for prompt removal.
1—56" 2-HIGH TEMPERING MILL FOR STRIP, including uncoiler, recoller, motors and controls.
1—18" BAR MILL, single stand, with tilting table, drive and furnace.
1—ROD MILL for non-ferrous metals, including motors and coils.

3—9" x 12" UNITED COLD MILLS, 2-high, individual drives, combination pinion stands and gear reduction sets, collars.
1—2500 H.P. DC MOTOR, 175/350 RPM
1—2000 H.P. MOTOR, 6600 volts, 3 phase, 60 cycle, 600 RPM.
1—1250 H.P. MOTOR, 6600 volts, 3 phase, 60 cycle, 600 RPM.
1—1500 H.P. GEAR REDUCTION SET with flywheels, ratio 570 to 35 RPM.
1—ROLLER LEVELLER, 17 rolls, 60" face, with motor drive.
1—BAR STRETCHER, hydraulic, capacity up to 1 3/4" dia. x 12 to 17' long.
1—BAR SHEAR, capacity 3 1/2" round.

Typical: Furnishing continuous heating furnace and roller-catcher tables for modernization of foreign sheet mill.

SEND FOR EQUIPMENT LIST

FRANK B. FOSTER, INC., 2220 OLIVER BUILDING, PITTSBURGH 22, PA.

Cable: "Foster Pittsburgh"

Telephone ATlantic 1-2780

FOR SALE Stretcher Leveler

**150 Ton — Garrison
Hydraulic No. 2**

Capacity—48" x 135"
12 Ga. Mild Steel
14 Ga. Stainless Steel
Up To Double These Gauges
In Aluminum
Equipped with Hele-Shaw Pumping
self contained system.—3,000 PSI

Thoroughly Reconditioned

LURIA BROTHERS & CO., INC.

Indust. Equip. Division
600 Lincoln Liberty Bldg.
Philadelphia 5, Penna.
Phone RIttenhouse 6-7455
Att. Arnold Landesberg

FURNACES

ROLLER HEARTH:

Surf. Comb. 84" x 29' Radiant Tube
Surf. Comb. 47" x 35' Radiant Tube
Elec. Furn. Co. 24" x 13' Elec.—170KW
Elec. Furnace Co. 57" x 20' Gas Fired
Elec. Furn. Co. 54" x 13' Radiant Tube
General Elec. 16" x 12' Elec.—127 KW
Elec. Furn. Co. 29" x 17' Radiant Tube

PUSHER (Gas Carburizers):

Holcroft 72" x 29' Continuous
Holcroft 36" x 45' Continuous

CONVEYOR:

Holcroft 20" x 12' Gas Fired

THE JOE MARTIN COMPANY

19256 John R. Street Detroit 3, Mich.
Phone: TW 2-9400

EST. 1904

DAVIDSON PIPE COMPANY INC.

ONE OF THE LARGEST STOCKS IN THE EAST

Seamless and Welded 1/8" to 26" O.D.

All wall thickness Manufactured.

Specialty large sizes.

Cutting — Threading — Flanging —
Fittings — Valves.

Call GEdney 9-6300

50th St. & 2nd Ave., B'klyn 32, N.Y.

800 H.P. MILL MOTOR

800 HP, 870 RPM Westinghouse Slip Ring.
Type CW, 2200/3/60.
Complete with semi-automatic control
panel & flexible coupling.

F. H. CRAWFORD & COMPANY, INC.
30 Church Street New York 7, N. Y.

3—10-ton Shaw Overhead Cranes, 67' 1"
span, 230 VDC, box girders, structural
end trucks, cage type Shaw motors
and control, mechanical and electrical
brake on hoist—heavy type—good
condition—stored inside—ready to
ship. PRICE f.o.b. Pittsburgh, Pa.

\$9,500.00 each

SEND ME YOUR CRANE INQUIRIES—
200 other cranes, various tonnages,
spans and current.

JAMES P. ARMEL—Crane Specialist
710 House Bldg. Pittsburgh, Pa.
Telephone: Grant 1-4449

NEW PIPE
Warehouse Stocks of
STANDARD • MERCHANT
LAP WELD • SEAMLESS
BUTT WELD • SPIRAL WELD
LB FOSTER CO.
HOUSTON 2, TEX. CHICAGO 4, ILL.
PITTSBURGH 30, PA. NEW YORK 7, N.Y.

FOR RENT

American, steam, 50 ton revolver. 60'
gantry, one year minimum.

J. L. PRAYTOR

1505 North 34th Street, Birmingham, Alabama

OFFERING

BRIDGE CRANES

ARNOLD HUGHES COMPANY
765 Penobscot Bldg. Detroit, Mich.
Woodward 1-1894

LOCOMOTIVE CRANES
40 ton Browning Diesel 30 ton Industrial Diesel
40 ton Orton Diesel 15 ton Browning Gas
20 ton Orton Gas
LOCOMOTIVES
16 ton Whitecomb B/G \$2,500.00
78 ton Fireless 8 ton to 65 ton Diesel
GANTRY CRANES, DERRICKS
STONE THE CRANE MAN
1132 Prudential Bldg. Buffalo 2, N. Y.
Phone: Mohawk 4494

23 NEW STEEL TANKS

9—10,000 GAL. CAP. 1/4 IN. SHELL
5—15,000 GAL. CAP. 5/16 IN. SHELL
9—20,000 GAL. CAP. 3/8 & 5/16 IN.
SHELL
LESTAN CORP., ROSEMONT, PENNA.

MACHINES FOR YOUR YARD

Silent Hoist Crane Krawler
Hanson truck crane
Lessman front end loader
Butler fork lift truck
Butler Carscoop
20"x40' port. belt conveyor
TRACTOR & EQUIPMENT CO.
10006 Southwest Highway, Oak Lawn, Ill.

FOR SALE

1948 Invoice Price
Unused 90 inch Cupola, Skip Hoist Charger,
Blower with Automatic controls all in original
container. Purchased as a unit.
UNITED STATES STOVE CO.
South Pittsburgh, Tennessee

LIFTING MAGNETS

A complete magnet service. Magnets, new &
rebuild, generators, controllers, reels, etc.

Magnet specialists since 1910

Goodman Electric Machinery Co.
1060 Broad St. Newark 2, N. J.

FOR SALE

40-ton capacity Orton Model 40 Diesel
Locomotive Crane, Built 1942. Cat.
D17000 Engine. 65 Foot Boom. Excellent.
65-ton Whitcomb Diesel Electric Loco.
Class 0-4-4-0, 580 HP. New 1944.
44-ton Gen. Elec. Diesel Electric Loco.
New 1945. Class 0-4-4-0. 380 HP
14 Western 30 cu. yd. Side Dump Air
Dump Cars. All Steel Drop Door and
Lift Door Type.

MISSISSIPPI VALLEY EQUIPMENT CO.
501 Locust St. St. Louis 1, Mo.

THE CLEARING HOUSE

FOR SALE

PRICES BELOW OPS CEILING
FREE OF CMP . . . PRIME MILD

• STEEL PLATES •

(Stored in U. S. Customs Warehouse)
Open Hearth Commercial, Shipbuilding &
Boiler Quality—3/16" to 1-7/8" thick

• LOCOMOTIVES •

Switching Engines — Excellent Condition
25-TON PLYMOUTH, STD. GA.,
MODEL RXIS

12-ton Climax-Plymouth, Std. Ga.,
Model R-6-U

• RELAYING RAILS •

500 TONS—130#

ALSO 100 TONS TIE PLATES AND ANGLE BARS
FOR 70-75# RAILS

NATIONAL METAL & STEEL CORP.

Dept. 1A, Terminal Island (Los Angeles Harbor), Calif.

Phone: NEVADA 6-2517

RAILS NEW and RELAYING

Your exact trackage needs
filled "Faster From Foster"
Track Tools & Accessories
are properly matched and
fabricated to meet all re-
quirements and shipped
from a reliable source.

"FASTER from FOSTER"

RENT STEEL SHEET

PILING

All Lengths, Sections,
all standard makes
your job requires.
Also Rent Pile Ham-
mers, Pile Extractors.

TRACK ACCESSORIES • PIPE • WIRE ROPE

LB FOSTER CO.

Pittsburgh 30, Pa.

New York 7, N.Y.

Chicago 4, Ill.

Houston 2, Tex.

FOR SALE

Freight car repair parts

Relaying rails

Steel storage tanks

Freight cars and

Locomotives

Also

Contracting Equipment

Cranes—Tractors

Ditchers—Compressors

Diesel Engines

and Generating Sets

THE PURDY COMPANY

8754 S. Dobson Ave.

Chicago 19, Illinois

Empire State Bldg.

New York 1, N. Y.

EVERYTHING FOR THE TRACK FROM SWITCH TO BUMPER

NEW & RELAY RAILS

in stock

12# THRU 130# SECTIONS

ACCESSORIES & SWITCH MATERIALS
INQUIRIES SERVICED PROMPTLY

MORRISON
RAILWAY SUPPLY CORP.

RAND BLDG.

BUFFALO 3, N. Y.

EMPIRE BLDG.

BIRMINGHAM 3, ALA.

IMMEDIATE DELIVERY

25—ALL STEEL GONDOLAS—50 TON

25—EX. HEAVY FLAT CARS—70 TON

25—ALL STEEL HOPPERS—50 TON

10—BOX CARS—40 TON

**RAIL & INDUSTRIAL
EQUIPMENT CO., INC.**

30 Church Street, New York 7, N. Y.

R.R. Shop and Yard: Landisville, Pa.

FOR SALE

ARMCO INGOT IRON

5/8" x 5" x 13'5"

10,000# available
immediately. Mill Price.

GLOBE TRADING COMPANY

1815 Franklin St.

Detroit 7, Michigan

Phone—WOODWARD 1-8277

RAILS *New and Relaying*



TRACK MATERIALS AND
ACCESSORIES
CARRIED IN STOCK

SWITCH MATERIAL •
SPIKES & BOLTS • TRACK
TOOLS • TIES • TIE
PLATES • BUMPERS •
COMPLETE SIDE TRACKS

BUILDERS STEEL SUPPLY CO.
4201 WYOMING • P.O. BOX 138 • DEARBORN, MICH.

TANKS

10,000 Gallon R. R. tank car tanks

**FREIGHT CARS
CAR PARTS, RAILS**

Consolidated Ry. Equipment Co.
6702 So. Cicero Avenue, Chicago 38, Illinois

SALE OR RENT

—D6 Front-end loader
—TD-9 Front-end loader, 1950
—25-Ton Link Belt HC-90 Truck Crane 120' Beam
—20-Ton Lorain 414 Truck Crane
—2 Yd. Keeshing 803 Crane
—355 P. & H. Dragline
—35 Ton Davenport Diesel Electric Loco.
—No. 6 and 80-D Northwest Shovels
—10-Ton Link Belt Model 55 Wagon Crane
Pneumatic Tire mounted
—Northwest 25 Shovel Attachment
—10-Ton S&W Leg Derrick
—40-Ton Orton Diesel Loco. Crane
—40-Ton Industrial Brownie Oil Fired Loco.
Crane, New 1943

B. M. WEISS CO.

Girard Trust Co. Bldg., Phila. 2, Pa.
Rittenhouse 6-2311

FOR SALE STAINLESS STEEL TYPE 304

10 gauge 36" x 96", 20,000 lbs.

11 gauge 36" x 96", 2,000 lbs.

Material is HRAP #1 finish.

Original mill packing on skids.

Mill test reports available.

SHALLAND CORP.

131 Bruckner Blvd., N. Y. 54, N. Y.

PHONE: CYPRESS 2-5617

USED RAILROAD EQUIPMENT



CAR PARTS
LOCOMOTIVES
TANK CARS
BOX CARS

HYMAN-MICHAELS CO.

122 S. MICHIGAN AVE., CHICAGO 3, ILL.

New RAILS Relaying

We carry frogs, switches, spikes and bolts in stock
and most all sections of rails and track accessories.

M. K. FRANK

480 Lexington Avenue, New York, N. Y.
Park Building, Pittsburgh, Pa.
105 Lake St., Reno, Nevada

PIPE
VALVES and FITTINGS
All Sizes in Stock
NEW-USED
GREENPOINT IRON & PIPE CO., INC.
Boquet, Slagg & Meadow Sts. Brooklyn, N.Y.

EQUIPMENT AND MATERIALS WANTED

WANTED—UPSETTERS

1 1/2", 2" National and larger sizes.

WANTED— COLD HEADERS

Ball Headers, all sizes, 1/4", 3/8",
1/2", 5/8" Double Stroke Solid Die.

DONAHUE STEEL PRODUCTS CO.
1913 W. 74th Street, Chicago 36, Ill.

WANTED

USED COLUMN FACING MACHINE
to face 20" square columns.

P. O. Box 463 — Ottumwa, Iowa

WANTED

BRIDGE CRANES

ARNOLD HUGHES COMPANY
765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

WANTED

SURPLUS STEEL WALLACK BROTHERS

7400 S. Damen Ave. Chicago 36, Illinois

WEISS STEEL CO. INC.

600 WEST JACKSON BLVD.
CHICAGO 6, ILLINOIS

Buyers of Surplus Steel Inventories
32 Years of Steel Service

BUSINESS OPPORTUNITIES

PUMPS, ELECTRIC MOTORS, ETC.
CONTRACT 413

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Standard Time, on Tuesday, October 28, 1952, for Contract 413, for furnishing, testing and delivering deep well turbine pumps and deep well plunger pumps, electric motors and appurtenances for the Neversink intake chamber, the Downsville release water chamber and the intake and outlet chambers of the East Delaware tunnel, of the Delaware system, all as set forth in the specifications.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of the City of New York, in the amount of four thousand dollars (\$4,000.00), for the proper execution of the contract.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawing, requirements as to surety, etc., can be obtained in Room 1311, at the above address, upon application in person or by mail, by depositing the sum of five dollars (\$5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars (\$4.00) will be made for each other pamphlet returned in acceptable condition. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, RUFUS E. MCGAHEN, EDWARD C. MAGUIRE, Commissioners, Board of Water Supply; RICHARD H. BURKE, Secretary.

WANT TO BUY

3—AIR COMPRESSORS
3—2000 to 3000 FT. CAP.
OR 6—1000 to 1500 FT. CAP.

DARIEN CORP., 60 E. 42nd St., N. Y. 17, N. Y.

WANTED

2,000 to 3,000 KVA ELECTRIC FURNACE TRANSFORMER WITH TAP CHANGER, for 20,000 volts primary, 50 cycle, 3 phase current in good condition also circuit breaker for same.

A. KREIMERMAN
Av. Amsterdam 185 Mexico, DF;

BUSINESS OPPORTUNITIES

PLANTS FOR SALE

PLATE FABRICATING SHOP. Equipped for heavy plate work and stainless steel. Produces high pressure vessels for chemical industries, refineries, etc. Buildings 200,000 sq. ft. Located Pennsylvania.

MACHINE SHOP & FOUNDRY. Producing castings up to 20 tons. Large backlog of orders. Well established profitable business. Located in the East.

STEEL FABRICATOR. Well established business produces specialties for heavy industry. Business very profitable. Located near New York.

IRON FOUNDRY. Mechanized shop with latest equipment; mould conveyors, sand conveyors, etc. Capacity 125 tons of light castings per eight hour day. In full operation. Suitable for company requiring large amount of small castings. Located in the East.

EDWARD H. ZOLL

Industrial Properties Throughout the East
790 Broad St. Newark 2, N. J.
Phone Mitchell 2-2450

WANTED—INDUSTRIAL PLANTS

Our many buyers for machine shops, foundries, sheet metal shops, pipe and tubular product shops, stamping shops, will invest from \$25,000.00 to \$2,000,000.00 in going businesses. All interested parties please submit pertinent data including current financial statements.

BENDER REALTY CO.

10128 Lorain Ave., Cleveland, Ohio
Tele: 01.1-5209

PLANNING TO BUY A PLANT?

What you are looking for
may be in *The Iron Age*.

Look here first.

YOU NEED A NEW YORK OFFICE

EXPERT SALES REPRESENTATION.
EXCELLENT LOCATION—RADIO
CITY AREA.

If your product is **STEEL**, contact us about the advantages in having us represent you in the New York area with all the advantages of your own New York office at no extra cost.

Address Box S-834, care *The Iron Age*, 100 E. 42nd St., New York 17

EMPLOYMENT EXCHANGE

The meeting place for employers and men qualified for positions in the metalworking industry.

Help Wanted Rates

Employment Service Rates

Representatives Wanted Rates

Accounts Wanted Rates

Set Solid—50 words or less.....	\$10.00
Each additional word.....	25c
All capitals—50 words or less.....	\$16.00
Each additional word.....	32c
All capitals, loaded—50 words or less.....	\$19.50
Each additional word.....	39c

Situation Wanted Rates Payable in Advance

Set solid—25 words or less.....	\$2.50
Each additional word.....	10c
All capitals—25 words or less.....	\$3.75
Each additional word.....	15c
All capitals, loaded—25 words or less.....	\$5.00
Each additional word.....	20c

COUNT SEVEN WORDS FOR KEYED ADDRESS

EMPLOYMENT SERVICE

Immediate Openings for Metallurgists and Foundry Men

We now have positions available in practically all fields, including technical service and sales. Salaries range from \$4,000 to \$10,000. Openings in all sections of the country. Write or phone for full particulars. Your inquiry held in confidence.

EMPLOYERS SERVICE BUREAU

Phone: Financial 6-1155
6 N. Michigan Ave. Chicago 2, Ill.

HIGH GRADE MEN — Salaries \$5,000 to \$25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Controllers, Accountants and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bureau, 20 W. Jackson Blvd., Chicago 4.

ELECTRICAL ENGINEER—for design and development of small, fractional, sub-horsepower motors—salary commensurate with experience. Other openings for electrical engineers. Write Elyria Placement Service, 30 Century Block, Elyria, Ohio, confidential, ethical, private employment service. Openings for Chief Design engineer, inquiries from other openings invited. Personnel request from employers welcomed.

HELP WANTED

WANTED

General superintendent or one who is thoroughly experienced in all phases in manufacturing cold finished bars and now acting in supervisory position either as foreman or assistant to superintendent.

Must be able to take full charge of mill operations and understand mill production.

Excellent opportunity offered to right party. Plant located in Eastern Seaboard Area.

Only those with full knowledge and experience need apply.

Replies held absolutely confidential.

ADDRESS BOX S-799

Care The Iron Age, 100 E. 42nd St., New York 17

ROLL TURNER

Wanted: Roll Turner. Experienced on bar mill and special shapes. Please

ADDRESS BOX S-839

Care The Iron Age, 100 E. 42nd St., New York 17

HELP WANTED

HELP WANTED

UNUSUAL SALES OPPORTUNITY

A nationally known company, of outstanding reputation, which makes and supplies basic raw materials to the steel, iron, and non-ferrous metal industries, now has a place in its organization for one or more applicants who fully meet its requirements for metallurgical sales representatives.

The men selected will join a rapidly expanding company that leads the field in a basic and important industry. Opportunities for advancement in salary and responsibilities are excellent, and will depend entirely upon achievement.

To qualify, applicants must be 25 to 35 years of age; must be graduates of an accredited metallurgical engineering school; should have three or four years of practical experience in open-hearth or electric-furnace melting; and must be willing to travel.

Consideration will be given to those who furnish full details as to age, education, training, experience, and salary expected. All replies will be treated with strict confidence. Address inquiries to:

Box S-830

The IRON AGE

100 East 42nd Street

New York 17, N. Y.

SALES EXECUTIVE

Well connected Steel and Alloy Industries in U. S. Experience in marketing imported metallic ores preferable. Excellent opportunity with well established organization. Please state qualifications in detail.

ADDRESS BOX S-833

Care The Iron Age, 100 E. 42nd St., New York 17

SALESMAN

Experienced in sale of Steel Pipe and Tubing or related items, to follow-up leads by telephone. Attractive starting salary with opportunity to build a real future for man who qualifies. Location in Midwest. Write in detail, giving complete information in first letter.

ADDRESS BOX S-825

Care The Iron Age, 100 E. 42nd St., New York 17

... Don't Hide Your Light Under A Bushel ...

Have something new on the market or do you just want to tell why your product does the job better? Either way, your advertisement in The Iron Age carries more weight and reaches more of your prospects.

WANTED—Design and Estimating Engineer with Industrial Furnace experience. Write fully giving experience and salary desired. Drever Company, 736-38 E. Venango Street, Philadelphia 34, Pa.

EMPLOYMENT EXCHANGE

HELP WANTED

WANTED

Assembly Yard Superintendent

Fully experienced on shop and yard assembly of structural steel fabrication for all types of bridges.

Excellent opportunity for man of experience — attractive salary and bonus.

ADDRESS BOX S-850

Care The Iron Age, 100 E. 42nd St., New York 17

METALLURGIST

Investment-Steel Castings

Opportunity for experienced man qualified to direct all phases of business.

ADDRESS BOX S-843

Care The Iron Age, 100 E. 42nd St., New York 17

MAN WANTED

Interested in purchase, sale and distribution of Ferro-Alloys. Must have knowledge of sources and consumers. Very profitable position. Write details in first letter.

ADDRESS BOX P-207

Care The Iron Age, 814 Park Bldg., Pittsburgh 22, Pa.

DESIGN ENGINEER

10 to 15 years practical experience in designing. Open-Hearth Furnaces. Write giving details to Employment Office.

BETHLEHEM STEEL CO.

501 E. Third St. BETHLEHEM, PA.

HELP WANTED

SALESMAN

Steel Warehouse handling Hot-Rolled Steel seeking salesman. Salary basis. Good prospects. Must have following, especially industrial accounts, Greater New York or New Jersey.

CONCORD STEEL CORPORATION
120 Wall Street New York 5, N. Y.

INDUSTRIAL SALES EXECUTIVE

Between the age of 45 and 60. Must be familiar with steel mill requirements.

ADDRESS BOX P-206

814 Park Building Pittsburgh 22, Pa.

METALLOGRAPHER

Senior Metallographer needed to take charge of new metallographic facilities in Technical Development Laboratory.

Write ATOMIC ENERGY DIVISION
E. I. du Pont de Nemours & Co., Inc.
Wilmington 98, Delaware

REPRESENTATIVES WANTED

SALES AGENT

WANTED

OLD ESTABLISHED GRAY IRON JOBBING FOUNDRY WANTS REPRESENTATION IN ST. LOUIS. SEND COMPLETE INFORMATION WITH EXPERIENCE AND REFERENCES.

ADDRESS BOX S-848

Care The Iron Age, 100 E. 42nd St., New York 17

Specialty Houses concentrating machine tools and appliances wanted by importer to distribute new lines quality tools and accessories from us. Stocks in following areas: Eastern New York, New Jersey, Eastern Pennsylvania and Midwest.

ADDRESS BOX S-852

Care The Iron Age, 100 E. 42nd St., New York 17

ACCOUNTS WANTED

MANUFACTURERS AGENT

Accounts wanted by reliable sales firm with Pittsburgh office and covering Western Pennsylvania, Upper New York State, Eastern Ohio, and West Virginia. Call: Atlantic 1-2779.

ADDRESS BOX P-205

Care Iron Age, 814 Park Bldg., Pittsburgh 22, Pa.

DETROIT-AUTOMOTIVE

MANUFACTURERS' AGENT

Having wide and close acquaintance with buyers and engineers of all of the automobile manufacturers and who has highly successful record, is desirous of representing manufacturer, making any production item or accessory which would be of interest to the car makers.

ADDRESS BOX E-51

Care Iron Age, 103 Pallister Ave., Detroit, Mich.

IMPORTING AGENT BRAZIL successful Rio De Janeiro office now visiting New York desires representation serious manufacturers and/or exporters mainly tin plate, steel products, chemicals. Preferably sightdraft basis in view Brazilian letter of credit restrictions. Possible outside financing with buyers furnishing best bank guarantees. Address Box S-856, care The Iron Age, 100 E. 42nd St., New York 17.

ESTABLISHED MANUFACTURER'S Agent calling on Manufacturers, Contractors, Architects, Municipalities in Toledo and Northwestern Ohio desires additional accounts. Efficient representation on commission basis. Address Box S-845, care The Iron Age, 100 E. 42nd St., New York 17.

WESTERN AND CENTRAL New York State. Well established manufacturers' agent is seeking additional major production line. Excellent sales record. Complete and efficient coverage of industrial plants guaranteed. Address Box S-846, care The Iron Age, 100 E. 42nd St., New York 17.

SITUATIONS WANTED

ENGINEERING EXECUTIVE, Vice President, General Manager, Works Manager. Capable administrator with ability to handle comprehensive manufacturing and management problems desires permanent association with medium size firm financially sound. Twenty-five year's manufacturing and management experience including labor relations. Thorough knowledge of modern manufacturing techniques coupled with outstanding Washington contacts. Sound reason for change. Address Box S-855, care The Iron Age, 100 E. 42nd St., New York 17.

BAR MILL SUPERINTENDENT—Practical experience 25 years in steel mills. Hand and continuous—Roll Design—Merchant Products—Strip—Alloy Steels—Rolling and Engineering Background. Capable of directing complete operations. Address Box S-783, care The Iron Age, 100 E. 42nd St., New York 17.

ROLLING MILL ENGINEER. Twenty-eight years experience as designer and assistant chief engineer with manufacturer of rolling mill equipment. Design, development, proposals and specifications. Available immediately. Address Box S-844, care The Iron Age, 100 E. 42nd St., New York 17.

METALLURGIST—4 years experience investigating forging, heat treating, fabricating problems on stainless, high temperature alloys, valve steels desires responsible position with steel mill or fabricator. Address Box S-847, care The Iron Age, 100 E. 42nd St., New York 17.

SALES EXECUTIVE dealing with industrial trade has proven record of successfully building two business's from its inception on percentage basis. Only interested in a sound proposition. Address Box S-837, care The Iron Age, 100 E. 42nd St., New York 17.

ACCOUNTANT, thoroughly conversant with machine tool and metal working industries desires contact with firms requiring complete or supplementary accounting and tax service. Address Box S-840, care The Iron Age, 100 E. 42nd St., New York 17.

VICE PRESIDENT sales past fourteen years to industrial trade desires to represent reputable manufacturer of heavy machinery equipment on manufacturing agency basis. Address Box S-838, care The Iron Age, 100 E. 42nd St., New York 17.

MACHINE SHOP SUPERINTENDENT with wide experience in both Production and Jobbing Shops would like connections with a growing and progressive company. Address Box S-842, care The Iron Age, 100 E. 42nd St., New York 17.

PURCHASING AGENT, Extensive experience steel, Diesel Engines, Machine tools, capable taking complete charge purchasing inventory control. Address Box S-841, care The Iron Age, 100 E. 42nd St., New York 17.

ATTORNEY with general law practice desires responsible position with progressive industrial organization. Address Box S-851, care The Iron Age, 100 E. 42nd St., New York 17.

CONTRACT MANUFACTURING

THE DIRECTORY

OF PRODUCTION SERVICES

[This section appears in the first and third issues of each month. See advertisers index in these issues.]

Carrying the announcements of plants offering specialized experience and facilities for the production of STAMPINGS, SPINNINGS, WELDMENTS, WIRE FORMS, SPRINGS, SCREW MACHINE PRODUCTS, FORGINGS, CASTINGS, GEARS, DIES, ASSEMBLIES, SPECIAL MACHINERY; and services such as MACHINE WORK, HEAT TREATING, PLATING, GALVANIZING, etc.

ADVERTISERS IN THIS ISSUE

A	
Aaron Machinery Co., Inc.	438
Abbott Ball Co.	393
Accurate Perforating Co.	426
Acme Steel Co.	345
Acme Tank & Welding Co., Div.	
United Tool & Die Co.	244
Aaron Iron & Supply Co.	446
Aetna-Standard Engineering Co.	
The Front Cover	
All Products, Inc.	237
Air Reduction	148-149
Ajax Electric Co., Inc.	121
Ajax Electric Furnace Corp.	121
Ajax Electro Metallurgical Corp.	121
Ajax Electrothermic Corp.	121
Ajax Engineering Corp.	121
Ajax Manufacturing Co., The	355
Alemite Div. Stewart Warner Corp.	95
Allegheny Ludlum Steel Corp.	396
Allis-Chalmers Mfg. Co.	311
Allstates Equipment Co.	448
Aluminum Co. of America	136-137
Alvey-Ferguson Co.	414
American Air Compressor Corp.	444
American Aluminum Ware Co.	456
American Brake Shoe Co., Brake Shoe & Castings Div.	107
American Brass Co., The	111
American Electric Fusion Corp.	125-126
American Gas Association	96
American Gas Furnace Co.	86
American Lava Corp.	384
American Manganese Bronze Co.	429
American Metallurgical Products Co.	229
American Monorail Co., The	359
American Screw Co.	120
American Shear Knife Co.	417
American Society for Metals	329
American Welding & Mfg. Co.	216
Ames, B. C., Co.	356
Angier Corp.	354
Apex Tool & Cutter Co.	415
Applied Research Laboratories	352
Arc Machining, Inc.	456
Arco Corp.	296-297
Armel, James P.	450
Armstrong Bros. Tool Co.	416
Art Wire & Stamping Co.	427
Artco Industrial Co., Inc.	440
Associated Spring Corp.	321
Atlantic Screw Works, Inc.	120
Atlantic Steel Products Co.	432
Atlas Car & Mfg. Co., The	372
Atlas Portable Machine Sales Corp.	156
Axelton Mfg. Co.	295
B	
Babcock & Wilcox Co., Refrac- tories Div.	175
Babcock & Wilcox Co., The Tub- ular Products Div.	168
Bailey, William M., Co.	325
Baird Associates, Inc.	365
Bakelite Company, a Division of Union Carbide & Carbon Corp.	15
Baker & Co., Inc.	291
Baker, J. E., Co., The	317
Baldwin-Lima-Hamilton Corp.	171
Bardons & Oliver, Inc.	50-51
Barnes, Wallace Co., Div. Asso- ciated Spring Corp.	321
Barnes-Gibson-Raymond, Inc., Div. Associated Spring Corp.	321
Bath, Cyril, Company, The	362
Belmont Iron Works	457
Belyea Co., Inc.	445, 446
Bender Realty Co.	452
Bennett, Letcher W., & Sons	442
Bennett Machinery Co.	447
Bertsch & Company	430
Beryllium Corp., The	158
Bethlehem Steel Co.	1
Birdsboro Steel Fdry. & Machine Co.	24
Birmingham Committee of 100	353
Black & Decker Mfg. Co., The	337
Blake & Johnson Co., The	120
Blaw-Knox Co.	30-31
Bliss, E. W., Co., Press Div.	155
Board of Water Supply	452
Bliss & Laughlin, Inc.	421
Boiard Steel Corp.	433
Jotwinik Brothers of Mass., Inc.	444
Brainard Steel Co.	254
Brown & Sharpe Mfg. Co.	17-18-19-20
Brownell Hazard Machine Tools, Inc.	442
Buffalo Bolt Co.	310
Buffalo Forge Co.	84
Buhr Machine Tool Co.	57
Builders Steel Supply Co.	451
Bullard Co., The	211
Bullard, George H., Co.	430
Bunting Brass & Bronze Co.	106
C	
C-O-Two Fire Equipment Co.	92
Camcar Screw & Mfg. Corp.	120
Canton Drop Forging & Mfg. Co., The	458
Carborundum Co., Abrasive Div.	26-27
Carlisle Rubber Co., Inc.	446
Carpenter Steel Co., The	361
Central Screw Co.	120
Central Steel & Wire Co.	103
Challenge Machinery Co.	420
Chambersburg Engineering Co.	186
Chase Brass & Copper Co., Inc.	435
Chicago Electric Co.	449
Cia, Vale Do Rio Doce	78
Cincinnati Gear Co., The	206
Cincinnati Gilbert Machine Tool Co.	349
Cincinnati Milling Machine Co., The	315
Cincinnati Shaper Co., The	4
Clark Bros. Bolt Co.	416
Clearing Machine Corp.	374
Clemson Bros., Inc.	384
Cleveland Cap Screw Co., The	312
Cleveland Crane & Engineering Co., The Tramrail Div.	88
Cleveland Metal Abrasive Co.	117
Cleveland Punch & Shear Works Co., The	28
Cleveland Steel Tool Co., The	457
Coast Metals, Inc.	116
Colonial Broach Co.	214
Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div.	250
Columbia Steel & Shifting Co.	76
Commercial Contracting Corp.	417
Consolidated Railway Equipment Co.	451
Continental Screw Co.	120
Cowles Tool Co.	432
Crawford, F. H., & Co., Inc.	450
Crucible Steel Co. of America	351
Cullen-Friedstedt Co.	414
Curtis Pneumatic Machinery Div. of Curtis Manufacturing Co.	69
Cutler-Hammer, Inc.	Back Cover

(Continued on Page 456)

DYKEM STEEL BLUE

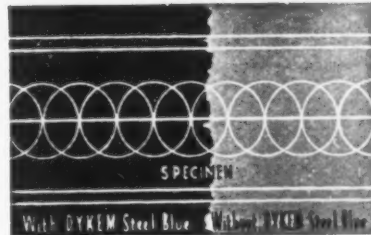
STOPS LOSSES

making dies & templates

Simply brush on right at the bench: ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information

THE DYKEM COMPANY, 2303G North 11th St., St. Louis 6, Mo.



Versatility counts in
HOT DIP GALVANIZING
any size or shape product, any size
order from the smallest to the largest

Excellent facilities
for Pickling
and Oiling

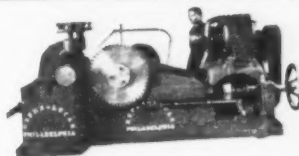
ENTERPRISE
GALVANIZING COMPANY

2526 E. Cumberland St. Philadelphia 2, Pa.



ALLOY-Tuf (soft) SHOT BES-tuf (standard) SHOT & GRIT

PHILADELPHIA STEEL ABRASIVE CO.
MODENA PA.
Phone COATESVILLE 2534



Cutting Off
Machines for
Saving All Kinds
of Metals

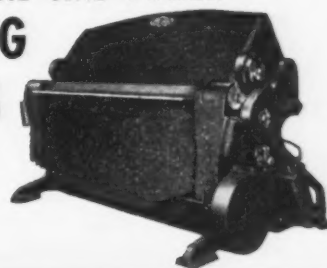
THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.



STEEL HAND AND POWER BENDING BRAKES

For Single and Quantity Runs
Bending Steel Plate and Sheet
Metal

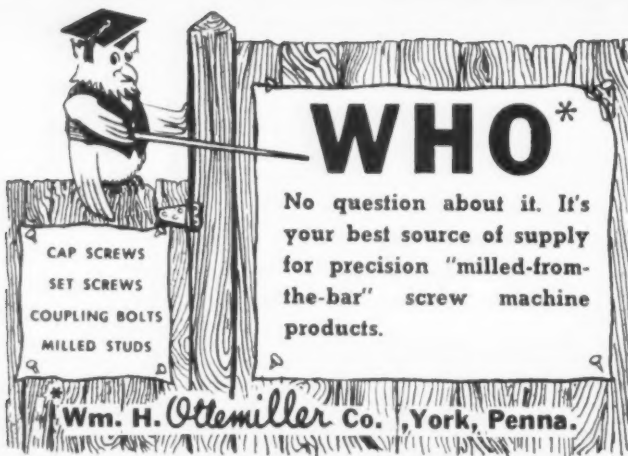
Special Bending Brakes
Double Folder Brakes



DREIS & KRAMP
MANUFACTURING COMPANY



7430 S. Loomis Blvd., Chicago 36, Illinois



WHO*

No question about it. It's your best source of supply for precision "milled-from-the-bar" screw machine products.

CAP SCREWS
SET SCREWS
COUPLING BOLTS
MILLED STUDS

Wm. H. Ottemiller Co., York, Penna.

Specialists in

ALUMINUM

Designers — Engineers — Manufacturers

STAMPINGS · DRAWINGS · SPINNINGS

For all industrial purposes

AMERICAN ALUMINUM WARE CO.

372 Jelliff Ave. Newark, N. J.

Send us your specifications

THE INTERNATIONAL HARDNESS SCALES (BRINELL-SHORE)

are included in Our Improved Portable Scleroscope Model D-1. This efficient Single Scale tester registers Brinell-Shore values under otherwise inaccessible conditions. 100% portable for floor and field work, dead soft metals or superhard steel either of brittle or thin cross section, non-destructive, accurate, speedy, always ready and fool-proof.

Send for Interesting Technical Bulletin and Prices

THE SHORE INSTRUMENT & MFG. CO., INC.

9025 Van Wyck Ave., Jamaica, N. Y.

CEMENTED CARBIDE Drilled, Tapped, Threaded, Broached within tolerances of .001 of specifications. Hardest man-made metals accurately machined save thousands of \$\$\$ in all types of tool and die work. Die revisions, corrections machined in hardened state with no material change. All work guaranteed. Write for details.

ARC MACHINING, INC.

724 N. Rochester Rd. Clawson, Michigan



HAYWARD BUCKETS

Use this Electric Motor Clam Shell for rehandling bulk materials in Industrial Plants

THE HAYWARD CO., 40-50 Church St., N.Y.



THE KING PORTABLE BRINELL

A hardness tester particularly adapted for use on CASTINGS and FORGINGS

Puts an actual load of 3000kg on a 10mm ball.

Throat, 4" deep.

Gap, 10" high.

Weight, 26 lbs.

Can be used in any position—even upside down.

Equally accurate as portable or stationary equipment.

Test head removable for testing larger pieces beyond the capacity of the standard base.

ANDREW KING

Box 606, Ardmore, Pa.

ADVERTISERS IN THIS ISSUE

D	G
Dake Engine Co. 185	Galland-Henning Mfg. Co. 102
Darien Corp. 449, 452	Garlock Packing Co., Inc. 82
Davidson Pipe Co., Inc. 450	General Chemical Div., Allied Chemical & Dye Corp. 343
Davis Keyseater Co. 432	General Electric Co., X-Ray Dept. 64
Delta-Rockwell Power Tool Div. 176-177	General Electric Co., Apparatus Dept. 128-129
Denison Engineering Co., The 218	General Refractories Co. 122-123
Detroit Broach Co. 41	Gibson, Wm. D. Co., Div. Associated Spring Corp. 321
DeVlieg Machine Co. 66	Giddings & Lewis Machine Tool Co. 98-99
Diamond Manufacturing Co. 432	Gisholt Machine Co. 53-54-55-56
Dings Magnetic Separator Co. 108	Gleason Works 157
Dodge Manufacturing Corp. 34-35	Globe Trading Co. 447, 451
Donahue Steel Products Co. 442, 452	Goodman Electric Machinery Co. 450
Dony, D. E., Machinery Co. 447	Goodyear Tire & Rubber Co. 10
Dow Chemical Co., The 353	Goss & DeLeeuw Machine Co. 432
Dow Corning Corp. 192	Graver Tank & Mfg. Corp. 52
Dravo Corporation 100	Gray Iron Founders' Society, Inc. 48
Dreis & Krump Mfg. Co. 455	Great Lakes Screw Corp. 120
Dunbar Bros. Co., Div. Associated Spring Corp. 321	Great Lakes Steel Corp. 29
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept. 391	Greaves Machine Tool Co. 431
Dykem Company, The 455	Greenpoint Iron & Pipe Co., Inc. 451
	Griffin Manufacturing Co. 420

E	H
Eagle Lock Co. 120	Haas, Miller Corp. 424
Earle Gear & Machine Co. 428	Hallden Machine Co., The 344
Eastern Machine Screw Corp., The 429	Hamilton Tool Co. 388
Eastern Machinery Co., The 440	Hammond Machinery Builders, Inc. 382
Eastern Metals Corp. 447	Hansen Manufacturing Co. 255
Eastern Tool & Mfg. Co. 432	Hanson-Van Winkle-Munning Co. 94
Eastern Tool & Stamping Co., Inc. 431	Harnischfeger Corp., Welding Div. 135
Eastman Kodak Co. 335	Harper, H. M., Co. 120
Easton Car & Construction Co. 381	Haynes Stellite Company, a Div. of Union Carbide & Carbon Corp. 89
Eaton Manufacturing Co., Fdry. Div. 169	Hayward Company, The 456
Edmont Manufacturing Co. 364	Heat & Power Co., Inc. 446
Elco Tool & Screw Corp. 120	Helical Tube Corp. 415
Electric Auto-Lite Co., Die Castings Div. 49	Hendrick Manufacturing Co. 415
Electric Controller & Mfg. Co. 224	Hevi Duty Electric Co. 369
Electric Equipment Co. 449	Hewitt Rubber Division, Hewitt-Robins, Inc. 367
Electric Storage Battery Co., The 146	Holcroft & Company 238
Electrolift, Inc. 428	Hooker Electro-Chemical Co. 174
Electro Metallurgical Company, a Div. of Union Carbide & Carbon Corp. 150-151	Hoskins Manufacturing Co. Inside Front Cover
Elgin National Watch Co., Abrasives Div. 11	Hough, Frank G., Co., The 181
Elox Corp. of Michigan 433	Houghton, E. F., & Co. 42-43
Elyria Placement Service 453	Hubbard, M. D., Spring Co. 429
Emerson Machinery Corp. 439	Huck Mfg. Co. 430
Employers Service Bureau 453	Hughes, Arnold Co. 450, 452
Engineering Mfg. Co. 433	Hy-Test Safety Shoes Div., International Shoe Co. 37
Enterprise Galvanizing Co. 455	Hyatt Bearings Div., General Motors Corp. 170
Erie Foundry Co. 139	Hyde Park Foundry & Machine Co. 313
Erie Steel Construction Co. 413	Hydraulic Press Mfg. Co., The 319
Espen-Lucas Machine Works, The 455	Hydopress, Inc. 130
Euclid Crane & Hoist Co., The 393	Hyman, Joseph, & Sons 444
	Hyman Press Sales Corp. 447
	Hyman-Michaels Co. 451

F	I
Fairbanks, Morse & Co. 77	Illinois Coil Spring Co. 305
Fansteel Metallurgical Corp. 320	Independent Pneumatic Tool Co. 38-39
Farrel-Birmingham Co., Inc. 109	Industrial Brownhoist Corp. 87
Federal Bearings Co., Inc., The 324	Ingalls Iron Works Co., Inc., The 49
Federal Products Corp. 13	Ingersoll Steel Division, Borg-Warner Corp. 15
Fenn Manufacturing Co. 67	Inland Steel Co. 215
Ferry Cap & Set Screw Co., The 309	Inter-Continental Trading Corp. 43
Finkl, A., & Sons Co. 161	International Mchry. Co., Ltd. 4-9
Follansbee Steel Corp. 298	International Nickel Co., Inc., The 15
Foot Mineral Co. 385	Iron & Steel Products, Inc. 443
Foster, Frank B., Inc. 450	Ivins, Ellwood Steel Tube Wks., Inc. 43
Foster, L. B., Co. 392, 451	
Fox Company 448	
Frank, M. K. 451	

ADVERTISERS IN THIS ISSUE

J	
Jandru Steel Corp.	449
Jarvey Mfg. Co., The	80
Jekop Steel Company	323
Johnson Bronze Co.	348
Johnson Gas Appliance Co.	418
Johnson Machine Works	428
Johnson Steel & Wire Co., Inc.	44
Jarlet Wrought Washer Co.	381
Jones & Lamson Machine Co.	134
Jones & Laughlin Steel Corp.	101
K	
Kaiser Aluminum & Chemical Sales, Inc.	40
Kaydon Engineering Corp., The	227
Kemp, C. M., Mfg. Co., The	246
Kennilworth Steel Co., The	9
Kester Solder Co.	346
Kinderman, Lou F.	444
King, Andrew, Co., The	456
Kings County Machinery Exchange	447
Kingsbury Machine Tool Corp.	166-167
Kinnear Manufacturing Co., The	370
Kirk & Blum Mfg. Co.	368
Knight, Maurice A.	376
Knox, Earl E., Co.	444
Kold-Hold Manufacturing Co.	300
Koppers Co., Inc., Tar Products Div.	423
Koppers Co., Inc., Engineering & Construction Div.	90-91
Korhmel Steel & Aluminum Co.	248
Kreimerman, A.	452
L	
Labelon Tape Co., Inc.	392
Lake Erie Engineering Corp.	46-47
Laminated Shim Co., Inc., Stampings Div.	292-293
Lamson & Sessions Co., The	120, 230
Land, L. J., Inc.	445
Landis Machine Co., Inc.	14
Lang Machinery Co.	444
Lapointe Machine Tool Co., The	162-163
La Salle Steel Co.	187
Leake Stamping Co., The	328
Lebanon Steel Foundry	208
LeBlond, R. K., Machine Tool Co., The	60-61
Leeds & Northrup Co.	307
Lehmann, J. M., Co., Inc.	441
Leland-Gifford Co.	457
Lestan Corp.	450
Lewis Foundry & Machine Div. of Blaw-Knox Co.	30-31
Linde Air Products Company, a Div. of Union Carbide & Carbon Corp.	59
Link-Belt Co.	72
Llewellyn Associates, Inc.	442
Lobdell United Co., Div. United Engineering & Foundry Co.	110
Lodge & Shipley Co., The	105
Lowe Bros. Co., The	32-33
Luria Bros. & Co., Inc.	403, 450
M	
McDaniel Refractory Porcelain Co.	383
McKay Company, The	143
McKee, Arthur G., & Co.	331
MacCabe, T. B., Co.	449
Machine Tools Sales Co.	442
Magnaflux Corp.	407
Mahon, R. C. Co., The	141
Mallory, P. R., & Co., Inc.	112
Manning, Maxwell & Moore, Inc.	386
Markal Co.	334
Marshall Products Co.	422
Martin, Joe, Co., The	450
Master Bronze Powder Co.	392
Mathews Conveyor Co.	457
Maxwell Machinery Corp.	444
Medart Co., The	302
Meehanite Metal Corp.	154
Metal Suppliers Co.	444
Michigan Steel Tube Products Co.	380
Midvale Company	131
Miles Machinery Co.	445
Mississippi Valley Equipment Co.	450
Molybdenum Corp. of America	399
Monarch Machine Tool Co.	97
Moorhead Electrical Mchry. Co.	449
Morey Machinery Co., The	436-437
Morgan Engineering Co., The	81
Morris Machine Tool Co.	212
Morrison Railway Supply Corp.	451
Match & Merryweather Machinery Co.	301
Mullite Refractories Co.	322
N	
National Acme Co., The	75
National Bearing Div., American Brake Shoe Co.	107
National Broach & Machine Co.	305
National Business Bourse, Inc.	453
National Carbon Company, a Division of Union Carbide & Carbon Corp.	303
National Lock Co.	120
National Machinery Co.	378
National Machinery Exchange	446
National Metal & Steel Corp.	451
National Roll & Foundry Co.	360
National Steel Corp.	29
National Screw & Mfg. Co.	120
Niagara Blower Co.	314
Niagara Machine & Tool Works	240-241
Nice Ball Bearing Co.	172
Northern Equipment & Supply Co.	444
Norton Company	62
O	
O'Brien, Clarence	446
O'Connell Machinery Co.	442, 446
Oakite Products, Inc.	202
Ohio Locomotive Crane Co., The	432
Olson Manufacturing Co.	425
Orban Kurt Co., Inc.	114
Osborn Mfg. Co., The	5
Ottomiller, Wm. H., Co.	456
Oven Bucket Co.	431
P	
Pangborn Corp.	Inside Back Cover
Parker-Kalon Corp.	120, 342
Pellets Inc.	457
Penn Brass & Copper Co.	104
Penn Iron Works, Inc.	426
Pennsylvania Salt Mfg. Co.	63
Perkins Machine & Gear Co.	344
Peterson Steels, Inc.	320
Pheoll Mfg. Co.	120, 239
Philadelphia Gear Works, Inc.	83
Philadelphia Steel Abrasive Co., Inc.	455
Philipp Brothers, Inc.	401

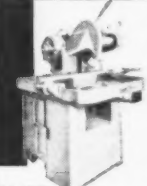
(Continued on Page 458)

PELLETS

For
**PEENING
and CLEANING**

PELLETS INC. BUFFALO, N. Y.

NEW YORK • DETROIT • CHICAGO



**TABOR ABRASIVE
CUTOFF MACHINES**

They're cut out to cutoff
bar stock and shapes

Send for literature. Specify shape,
size and material to be cut.

TABOR Manufacturing Co.
6222 Tacony St., Phila. 35, Pa.

10 H.P. 3 H.P.

THE CLEVELAND STEEL TOOL CO.

Punches, Dies, Chisels, Rivet Sets

660 E. 82nd St., Cleveland, O.

If it's **RIVETED** you **KNOW** it's safe

LELAND-GIFFORD

the **BIG NAME**
in
**DRILLING
MACHINES**

LELAND-GIFFORD COMPANY, WORCESTER, MASSACHUSETTS

THE BELMONT IRON WORKS

Structural Steel — Buildings & Bridges

Riveted — Arc Welded Cable Address — Belliron

Engineers — Fabricators — Erectors — Contractors — Exporters

SHOPS: PHILADELPHIA—EDDYSTONE—ROYERSFORD

New York Office: 44 Whitehall Street,
N. Y. 4, N. Y.

Main Office: Phila. 46, Pa.

MATHEWS

CONVEYERS

Since 1905. Engineers and manufacturers of Conveyers and
Conveyer Systems for the Metal-Working Industries.

Three modern plants. Engineering Offices in All Principal
Cities. There's an Engineering Sales Office near you.



MATHEWS CONVEYER CO.

ELLWOOD CITY . . . PENNSYLVANIA
SAN CARLOS CALIFORNIA
PORT HOPE . . . ONTARIO, CANADA

ADVERTISERS IN THIS ISSUE

(Continued from Page 457)

Pickands, Mather & Co.	347	Standard Pressed Steel Co.	144
Picker X-Ray Corp.	327	Standard Shop Equipment Co.	427
Pittsburgh Plug and Products Co.	433	Standard Steel Spring Co.	152-153
Pittsburgh Steel Co.	183	Standard Steel Works, Div., The	
Platt Bros. & Co., The	433	Baldwin-Lima-Hamilton Corp.	171
Praytor, J. L.	450	Stanley Works, The	390
Production Steel Company	209	Starrett, L. S., Co., The	189
Purdy Company, The	451	Steel City Testing Machines, Inc.	16

R

R and L Tools	173	Steel & Tube Div., Timken Roller	
Rail & Industrial Equip. Co., Inc.	451	Bearing Co.	145
Rathborne Hair & Ridgeway Box		Sterling Bolt Co.	120, 235
Co.	425	Stevens, Frederic B., Inc.	299
Raymond Manufacturing Co., Div.		Stone, R. J.	453
Associated Spring Corp.	321	Stover Steel Tank & Mfg. Co.	430
Reading Crane & Hoist Corp.	389	Strom Steel Ball Co.	389
Reed Engineering Co.	432	Stronghold Screw Prods., Inc.	120
Republic Steel Corp.	85	Stuart, D. A., Oil Co., Ltd.	25
Rhode Island Tool Co.	422	Sun Oil Co.	220
Richards, Arklay S., Co., Inc.	433	Superior Steel and Malleable	
Ritterbush & Co., Inc.	434-435	Castings Co.	132
Robins Conveyors Div., Hewitt-		Superior Steel Corp.	341
Robins Incorporated	367	Superior Tube Co.	394
Rock Bit Sales & Service Co.	448	Sutter, A. W., Co.	446
Rockford Screw Products Co.	120	Swindell-Dressler Corp.	164-165
Roebling's, John A., Sons Co.	58		
Roller Bearing Co. of America	236		
Roper, Geo. D., Corp.	336		
Ross Carrier Co., The	337		
Royal Netherlands Blast Furnace			
& Steel Wks.	418		
Russ-Elektroofen KG	426		
Russell, Burdall & Ward Bolt &			
Nut Co.	186		
Ryerson, Jos. T., & Son, Inc.	6		

S

SKF Industries, Inc.	138	Udylite Corp., The	245
St. Joseph Lead Co.	180	Union Carbide & Carbon Corp.,	
Salem-Brosius, Inc.	377	Bakelite Company	15
Sales Service Machine Tool Co.	424	Union Carbide & Carbon Corp.,	
Sandvik Steel, Inc.	247	Electro Metallurgical Co.	150-151
Scovill Mfg. Co.	120	Union Carbide & Carbon Corp.,	
Screw Research Assn.	120	Haynes Stellite Company	89
Seaboard Steel Co., Inc.	443	Union Carbide & Carbon Corp.,	
Selas Corp. of America	22-23	Linde Air Products Company	59
Seneca Wire & Mfg. Co.	379	Union Carbide & Carbon Corp.,	
Seymour Manufacturing Co., The	115	National Carbon Company	303
Shakeproof, Inc.	120	Unitcast Corp.	308
Shalland Corp.	451	United Engineering & Foundry Co.	157
Shell Oil Company	178-179	United States Steel Co.	190
Shenango-Penn Mold Co.	228	United States Steel Supply Div.,	
Shepard Niles Crane & Hoist		United States Steel Co.	190
Corp.	330	United States Stave Co.	450
Shimer, Samuel J., & Sons, Inc.	458	U. S. Steel Wire Spring Co.	424
Shore Instrument & Manufacturing			
Co., The	456		
Silent Hoist & Crane Co.	383		
Simmons Machine Tool Corp.	160		
Simonds Gear & Manufacturing			
Co., The	386		
Simonds Saw & Steel Co.	140		
Sipi Metals Corp.	444		
Siskrafft & Co., The	397		
Smith, A. O., Corp.	227		
Snap-On Tools Corp.	203		
Snyder Tool & Engineering Co.	118-119		
South Bend Lathe Works	73		
Southern Screw Co.	120		
Southington Hdwe. Mfg. Co.	120		
Sperry Products, Inc.	326		
Spo Milwaukee Foundry Equip-			
ment Div.	232-237		
Springfield Pattern Works, Inc.	427		
Standard Iron & Steel Co.	451		

T

Tabor Manufacturing Co., The	457
Teiner, Roland, Co., Inc.	413
Thomas Flexible Coupling Co.	375
Thomas Machine Manufacturing	
Co.	337
Timken Roller Bearing Co., The	133
Timken Roller Bearing Co., The	
Steel & Tube Div.	145
Titan Metal Mfg. Co.	359
Toledo Scale Co.	318
Tomkins-Johnson Co.	340
Townsend Co.	71
Tractor & Equipment Co.	450
Tramrail Div., The Cleveland	
Crane & Engineering Co.	88
Treadwell Engineering Co.	45

U

Udylite Corp., The	245
Union Carbide & Carbon Corp.,	
Bakelite Company	15
Union Carbide & Carbon Corp.,	
Electro Metallurgical Co.	150-151
Union Carbide & Carbon Corp.,	
Haynes Stellite Company	89
Union Carbide & Carbon Corp.,	
Linde Air Products Company	59
Union Carbide & Carbon Corp.,	
National Carbon Company	303
Unitcast Corp.	308
United Engineering & Foundry Co.	157
United States Steel Co.	190
United States Steel Supply Div.,	
United States Steel Co.	190
United States Stave Co.	450
U. S. Steel Wire Spring Co.	424

V

Vacu-Blast Co., Inc.	234
Valley Mould & Iron Corp.	124
Vanadium Corp. of America	363
Van Dorn Iron Works	316
Van Huffel Tube Corp.	21
Vickers, Inc.	79
Victor Saw Works, Inc.	390

ADVERTISERS IN THIS ISSUE

W

Wagner Electric Corp.	182
Wales-Beech Corp.	120
Wallack Bros.	452
Wallingford Steel Co., The	335
Wapakoneta Machine Co.	304
Ward Steel Company	253
Warner & Swasey Co.	142
Washington Steel Corp.	357

Waterbury-Farrel Foundry & Ma-	
chine Co.	68
Watson-Stilman Co.	113
Webb Corp., The	433
Weiger-Weed & Co., Div. Fansteel	
Metallurgical Corp.	320
Weirton Steel Co.	29
Weiss, B. M., Co.	451
Weiss Steel Co., Inc.	452
Weldit, Inc.	337
Westinghouse Electric Corp.	242-243
Wheelock, Lovejoy & Co., Inc.	192
Wheland Co., The	390
Wickwire Spencer Steel Div., The	
Colorado Fuel & Iron Corp.	250
Wigglesworth Industrial Corp.	444
Wilkie Die Products Co.	444
Williams, Edward Hale, Mfg.	
Engr.	445
Willson Products, Inc.	371
Wilmot Engineering Co.	252
Wirebound Box Manufacturers	
Assn.	74
Wolverine Tube Div. of Calumet	
& Hecla Consolidated Copper	
Co.	184
Wood, R. D., Co.	306

Y

Yoder Co., The	333
Youngstown Alloy Casting Corp.	93
Youngstown Sheet & Tube Co., The	70

Z

Ziv Steel & Wire Co.	426
Zoll, Edward H.	452

CLASSIFIED SECTION

Business Opportunities	452
Clearing House	434-451
Contract Manufacturing. Appears	
in first and third issue of each	
month.	
Employment Exchange	453-454
Wanted	452

SET
SCREWS
CAP
SCREWS
SPECIAL
PARTS

SCREW MACHINE PRODUCTS

made to your order

ACCURACY
IN DETAIL



SPEEDY
SHIPMENTS

STEEL
BRASS
STAINLESS
ALUMINUM

SAMUEL J. SHIMER & SONS, Inc.

Milton 2, Pa.

send us your specifications for quotation

FORGINGS

Hammered—Upset—Pressed—Extruded—Both Steel and Non-Ferrous Metals "Large and Small—We Forge Them All" on Hammers from 2000 lbs. to 35,000 lbs. Upsetters from 4" to 9" and Hydraulic and Mechanical Forging Presses. Modern Heat Treating Department.

THE CANTON DROP FORGING & MFG. CO.

CANTON, OHIO

FOR THE UNUSUAL IN
Seamless Steel Tubing...

ELLWOOD IVINS

1 1/4" O.D. and smaller!

ELLWOOD IVINS STEEL TUBE WORKS, INC.

700 Valley Road, Phila. 26, Pa.

WRITE—PHONE—WIRE

42 SOLD IN 86 DAYS

Pangborn's BLASTMASTER ROTOBlast Barrels on the production line. A total of 42 sold in 86 days makes it imperative to place your order now for delivery as soon as possible!



Pangborn's BLASTMASTER Rotoblast[®] Barrel must be good!

Within just 86 days of the introduction of Pangborn's BLASTMASTER ROTOBlast Barrel, a total of 42 were sold! And experienced foundrymen don't plunk down hard cash unless they *know* what they're getting!

Check the features of this Barrel that add to the performance of ROTOBlast: Non-clogging work conveyor! Automatic throw-out torque arm! Absolute abrasive-tight door and housing! Efficient cleaning and reclaiming

system! Quick-acting work loader! Centrally-located push-button control panel! And all this in a Barrel occupying a minimum of floor space and head room!

See now why the 42 sales? And that's just the beginning! If *you're* interested in more efficient, more rapid, more economical batch cleaning, better get your order in! For more information, write for Bulletin 223 to: PANGBORN CORP., 1500 Pangborn Blvd., Hagerstown, Md.

OVER 28,000 PANGBORN
MACHINES SERVING
INDUSTRY

Pangborn

Look to Pangborn for the
latest developments in Blast Cleaning
and Dust Control equipment

BLAST CLEANS CHEAPER

with the right equipment for every job

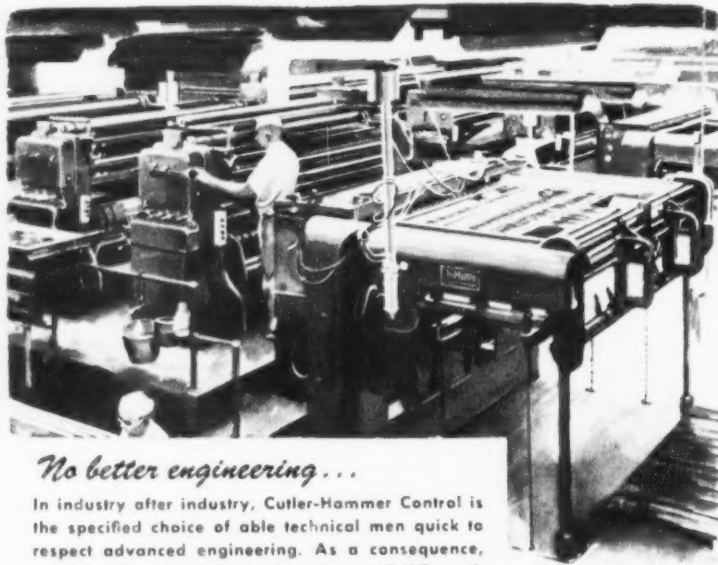
ROTOBLAST saves you money five ways:

- SAVES LABOR with push-button operation
- SAVES TIME by cleaning more loads per day
- SAVES SPACE because machines are compact
- SAVES TOOLS because all scale is removed
- SAVES POWER since no compressor is needed

Cutler-Hammer to be sure

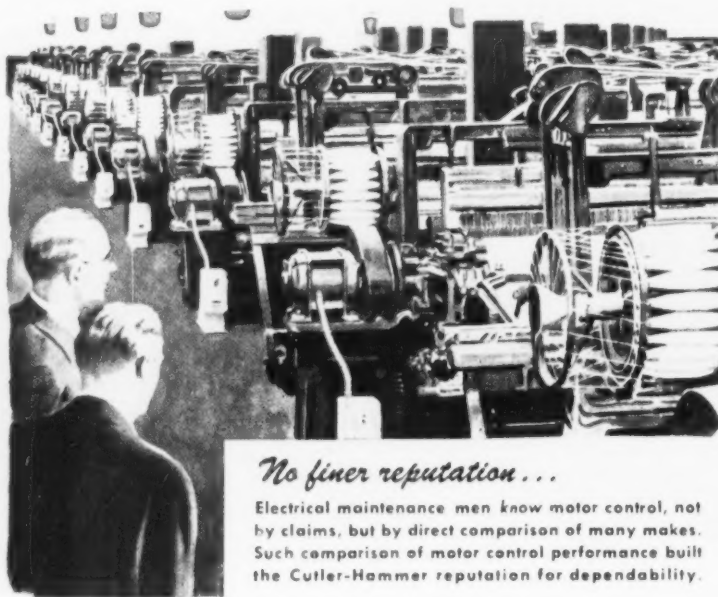
No broader experience...

Over the entire range of industrial control needs, from toughest mill jobs to smallest motor drives, every unit of Cutler-Hammer Control offers features born of 60 years experience in all industries.



No better engineering...

In industry after industry, Cutler-Hammer Control is the specified choice of able technical men quick to respect advanced engineering. As a consequence, many leading machinery builders feature C-H Control.



No finer reputation...

Electrical maintenance men know motor control, not by claims, but by direct comparison of many makes. Such comparison of motor control performance built the Cutler-Hammer reputation for dependability.

Within recent years, there has been a most evident and logical trend toward the regular specification of brand name in the purchase of motor control. And, more and more, the name thus specified has been Cutler-Hammer. This is also most logical, as no other name in motor control means so much.

For sixty years, Cutler-Hammer engineers have worked with the technical men of *all* industries on their specialized needs in motor control. In industry after industry, they have been in the forefront of progress, devising new control techniques and new con-

Cutler-Hammer general purpose motor control is recommended by a majority of all electric motor manufacturers, is featured as standard equipment by machinery builders, is carried in stock by recognized electrical distributors everywhere.



trol equipment to do things better, faster, and at lower cost. Forever creating to but *one* standard, they have made the Cutler-Hammer name synonymous with dependability wherever motor control is used.

To be sure, you too should always specify Cutler-Hammer when buying motor control. This will give you more for your money... better performance and longer life at *no* extra cost. Insist on the genuine, CUTLER-HAMMER, Inc., 1325 St. Paul Avenue, Milwaukee 1, Wis. Associate: Canadian Cutler-Hammer, Ltd., Toronto.

On the E
defense
In an a
crease ac
duce ma
departure
experience
ing from
The Gre